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July, 1957

'n this issue...

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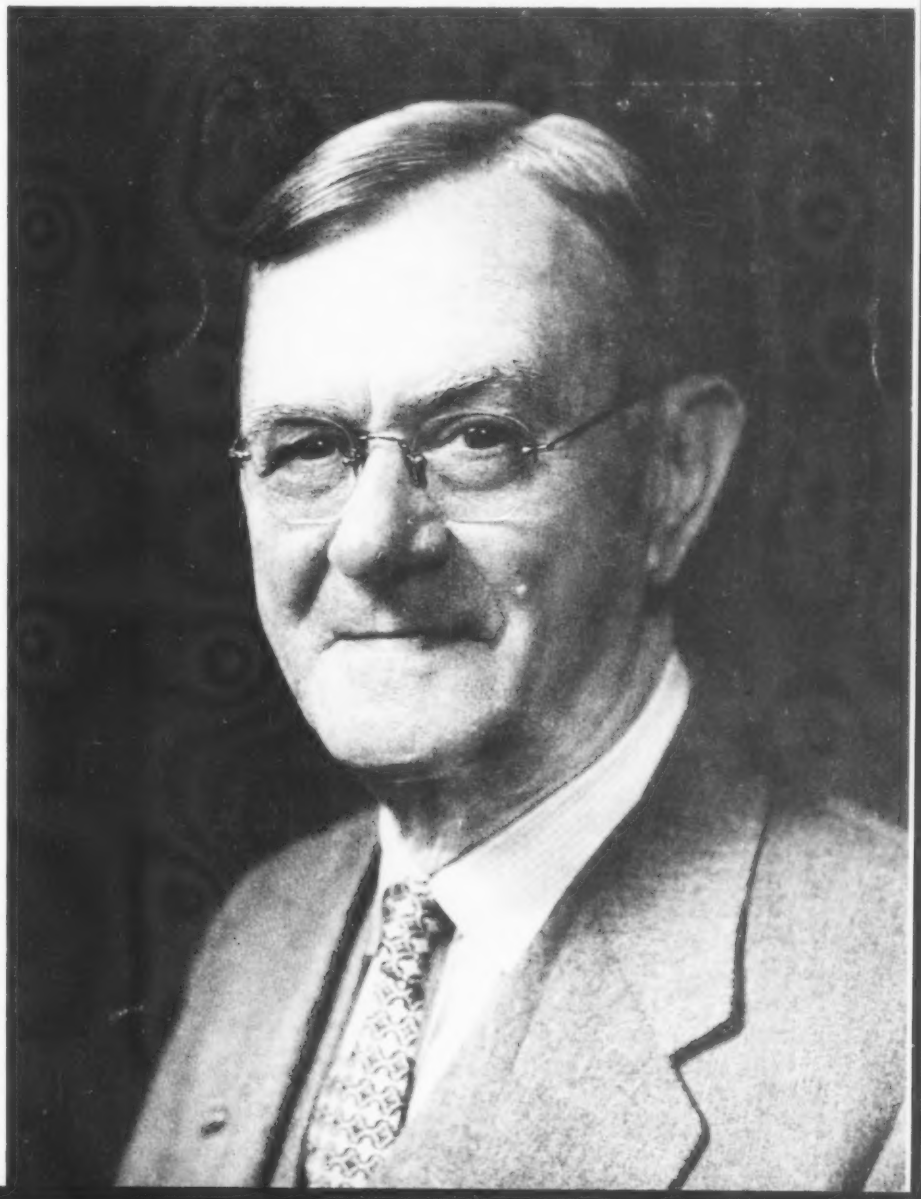
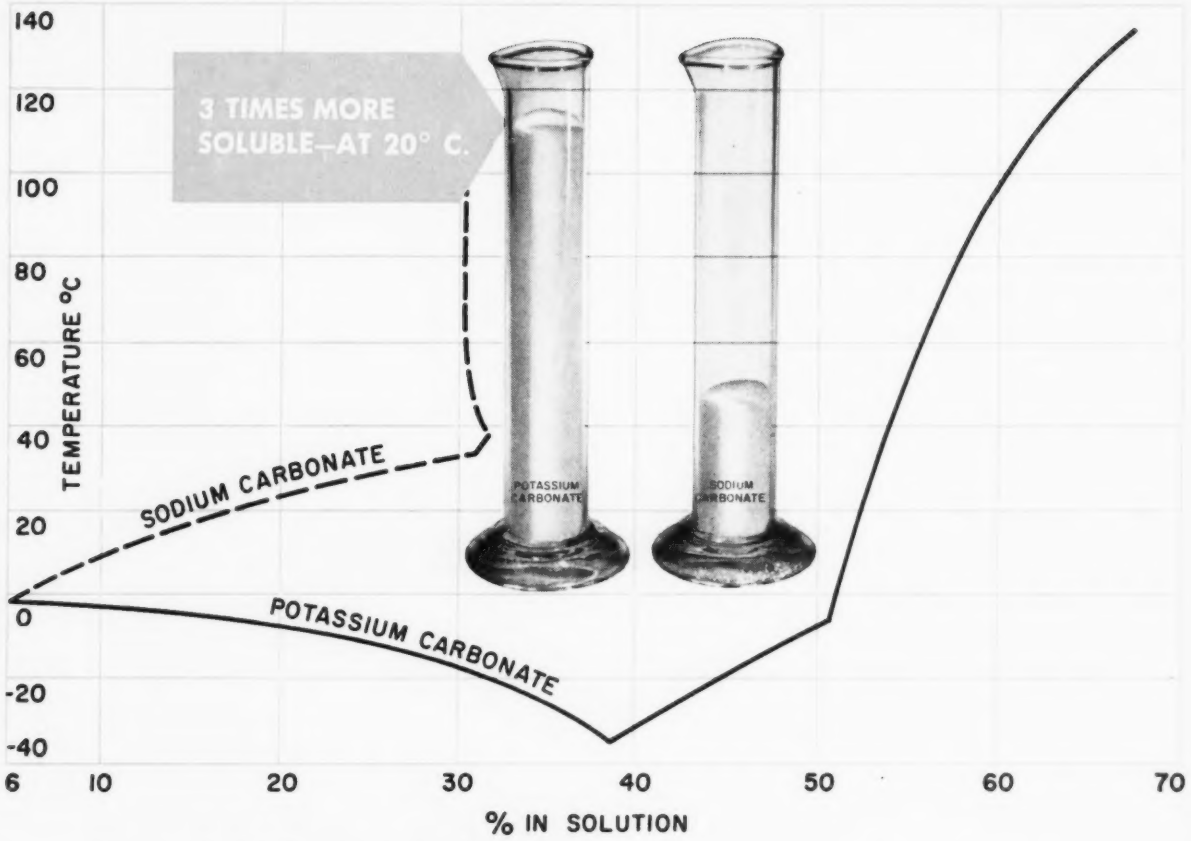


P. J. Wood, technical director of Royce Chemical Co., has just been announced as 14th winner of annual Olney Award of American Association of Textile Chemists and Colorists. Award will be presented during the 1957 AATCC convention Nov. 14-16 in Boston. It is given for "outstanding achievement in the field of textile chemistry."



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For more concentrated solutions...
Use Solvay POTASSIUM Carbonate

SOLVAY Potassium Carbonate is 3 times as soluble as sodium carbonate (soda ash) at room temperatures. This higher solubility permits the use and packaging of more concentrated solutions. In addition, the products of reaction with potassium carbonate are more soluble than those with sodium carbonate. Our chart shows the greater range of solubility . . . the wider range of temperatures at which it is effective.

In many fields substantial savings are being made by the switch to SOLVAY *Potassium* Carbonate. With it soap makers can add more builder to liquid cleaners. It also offers advantages in chemical processing, synthesis gas scrubbing, boiler feed-water treatment and cleansing.

Learn how you may apply SOLVAY Potassium Carbonate to your product or process.

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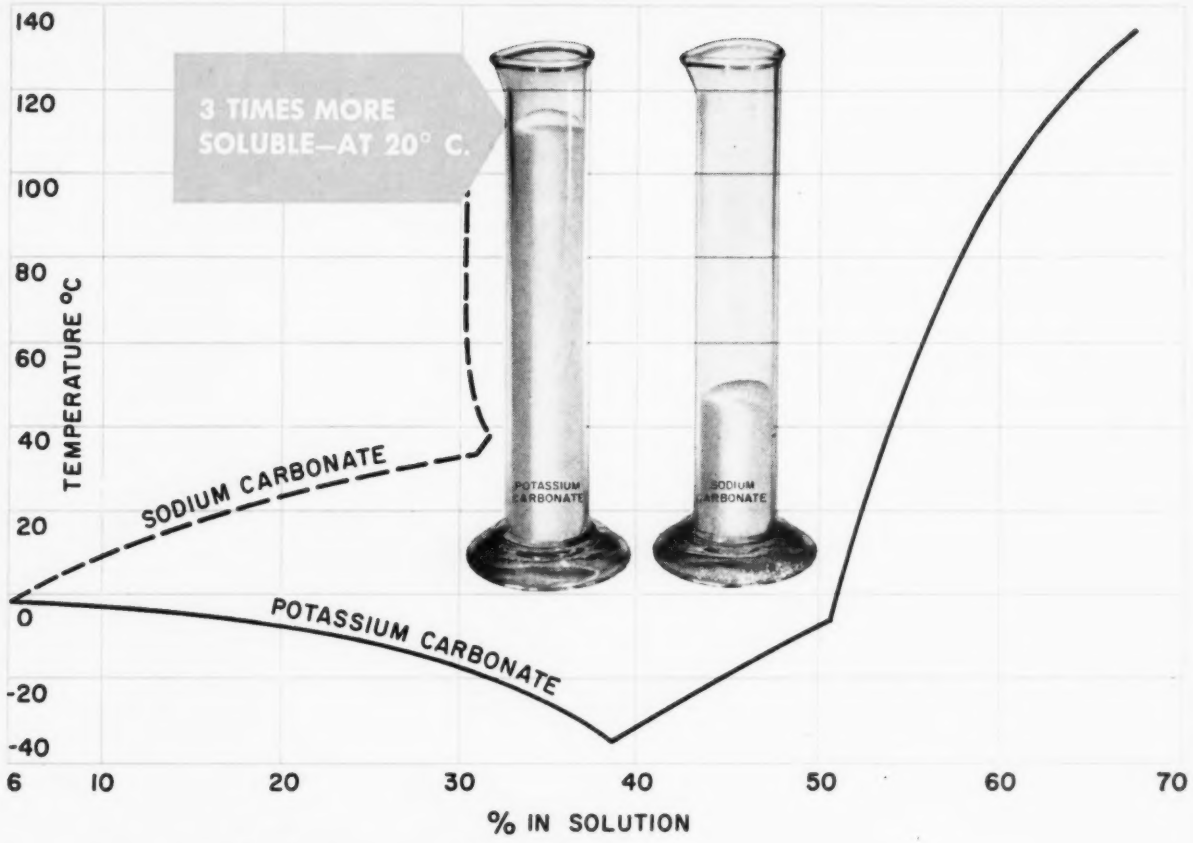

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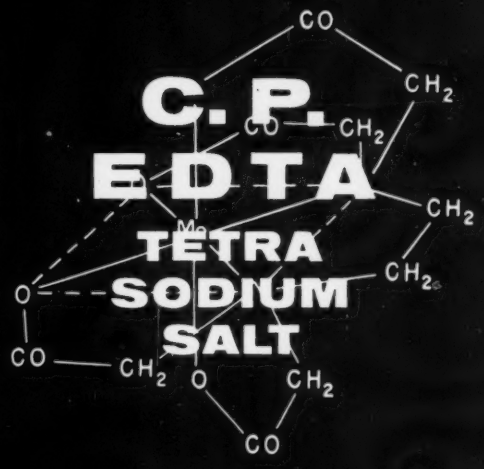

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Volume XXXIII, No. 7 July, 1957

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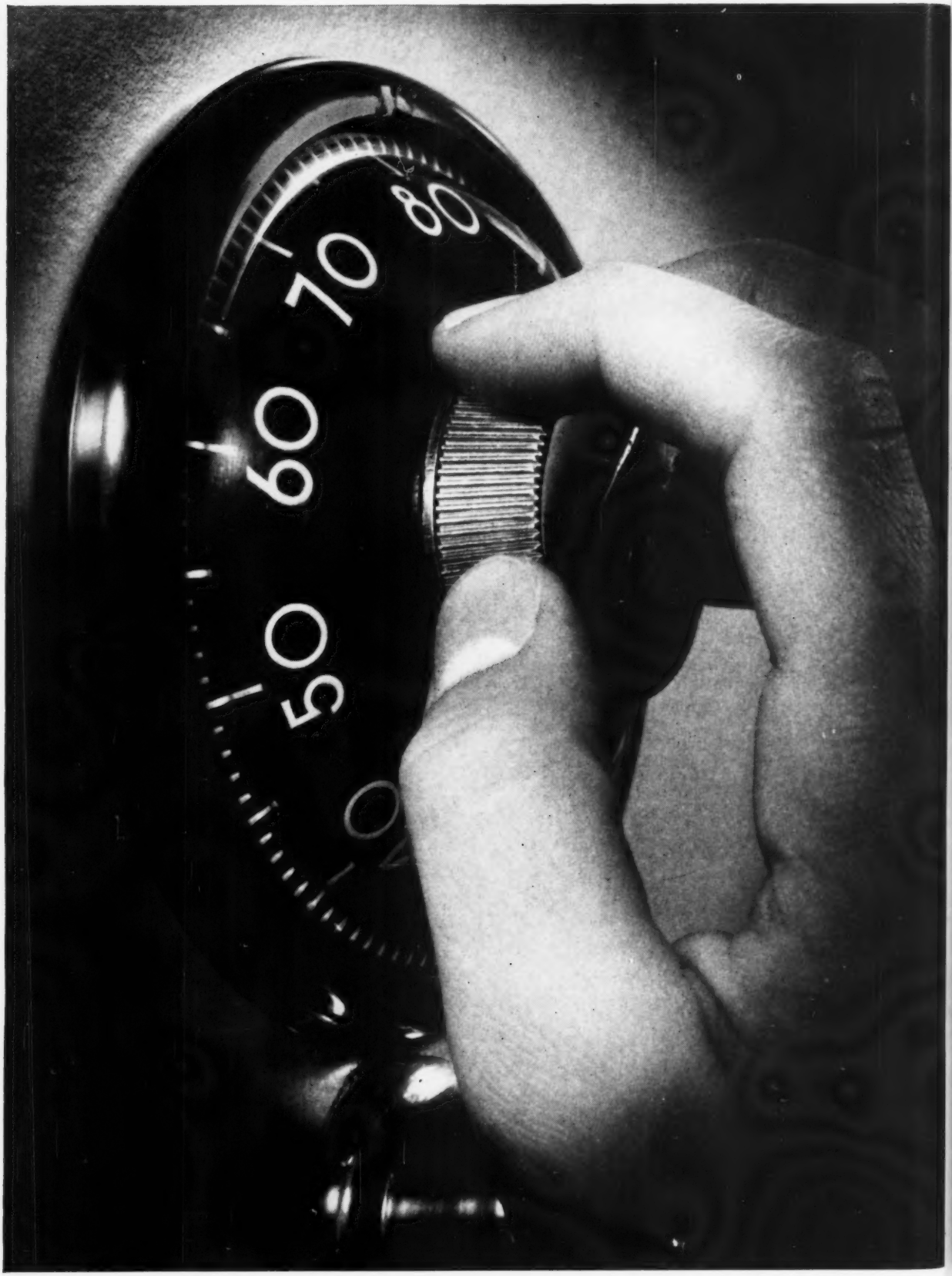

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Because the PLURONIC block-polymers provide an over-all balance of desirable properties . . . have unusual flexibility . . . are unique and different . . . they may provide the exact characteristics you need.

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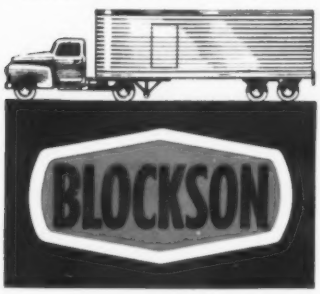

Sodium Tripolyphosphate • Trisodium Phosphate • Tetrasodium Pyrophosphate • Tetrapotassium Pyrophosphate • Sodium Polyphos (Sodium Hexametaphosphate-Sodium Tetraphosphate) • Sodium Acid Pyrophosphate • Trisodium Phosphate Chlorinated • Disodium Phosphate • Monosodium Phosphate • Hydrofluoric Acid • Sulfuric Acid • Sodium Fluoride • Sodium Silicofluoride • Hygrade Fertilizer • Teox 120 (Nonionic Surfactant)

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to guide you as a private brand distributor

SELF-POLISHING WAXES

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CANDY'S SUPREME (standard)
BRIGHT BEAUTY® (standard)
CANDY'S SUPREME Special WR
SUPER CAND-DOX®
CAND-DOX® #CS
CANDI-WAX #6000

All Candy's products are available for private brand resale and are sold only through distributors except for experimental accounts in Chicago essential to research.

Beauty and Durability

Initial appearance is important, but for a waxed surface to remain beautiful, it must be durable. Durability depends not only on resistance to abrasion of traffic, but even more so on resistance to discoloring marks. Durability should be measured by how long the waxed surface maintains a nice appearance before complete removal and re-waxing is required.

Anti-Slip

Anti-slip, or reasonable safety underfoot, does not mean that the qualities of beauty and protection need be sacrificed. The proper balance—a wax film which is not excessively slippery, yet which is not tacky and does not collect dirt readily—gives the performance that answers the foremost original reason for use of a floor wax... beauty and protection.

Water Resistance

Frequent damp mopping or wet traffic can make water resistance very important. Overdoing this quality when no problem exists out of the ordinary, simply increases the difficulty of complete removal or applying multiple coats. Removability must be considered as important as water-resistance under most normal conditions.

Solid Content

The percentage of solid content is not nearly as important as the **quality** of the solids. Good quality indicates 12% of solids as the answer for most well planned maintenance programs. Two applications of 12% gives better results than one of 18%. "Washed out" floors and other special problems maintain better when more concentrated waxes are used. Over-waxing and resultant greater difficulty in removal for periodic maintenance may do more harm than good.

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The most important features of a good wax ...all-around quality of performance...are built around Carnauba Wax. When refined and compounded with other additives and scientifically controlled in manufacture, Carnauba alone imparts the beauty and protection that makes the use of floor waxes both profitable and possible. Make-shift manufacture or over-emphasis on any one given wax feature should be avoided an proper care taken to provide for most satisfactory performance.

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For removal of water-emulsion waxes from any floor without harmful effects. It is the perfect maintenance program wax remover and all-purpose surface cleaner. Pleasant odor, crystal clear color and thorough cleaning action with all types of equipment. Unaffected by hard freezing. Furnished ready for resale or in concentrated form for local packaging...nothing but water to buy or mix in.

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A cream furniture polish that spreads easily, polishes without excessive effort to a deep impressive lustre. Permits repeated repolishing with a dry cloth, thus saving many re-applications. A very economical polish of the very highest quality.

Bright Beauty PASTE WAX
Properly blended and refined from excellent quality solids and solvents that produce the best drying time and evaporation. Easy to handle, having "creamy" consistency and stability that lasts throughout storage and usage life.

Bright Beauty LIQUID (spirit) PREPARED WAXES
A complete line of spirit dissolved waxes that meet a wide variety of demands for durability, color and types of usage. Each acts as a "dry cleaner" to keep surfaces waxed protected with a superb coating necessary for many applications such as wood and certain other types of floors for bars, wallpaper, etc.

Bright Beauty GLASS POLISH & CLEANER and SILVER POLISH
As a Glass Cleaner (pink color) it applies evenly with little effort, wipes off easily with negligible "powdering" and produces an undeniable "feel" of cleanness to glass. Different in color only as a Silver Polish, it polishes to a high lustre without abrasion and can even correct the abuses of scratchy "quick-polish" inferior products.

Bright Beauty DANCE FLOOR WAX
Does not "ball-up" and gather dirt that impregnates floors with hard spots difficult to remove...free from dusty effects. Its protective quality adds more "floor-years" to expensive ballroom floors.

Bright Beauty Heavy Duty PASTE CLEANER
Cleans and scours more effectively and quicker than most scouring powders. Depending on application, it can clean to perfection even painted walls to provide a suitable repainting surface. 100% active, free from excessive abrasive qualities, it frees almost every surface from all foreign matter.

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We call "Duponol" XL a pseudo-amphoteric because it contains two hydrophilic sites—one, an amphoteric structure, the other an anionic sulfate. Combined, they offer features unmatched in other shampoo detergents. "Duponol" XL, for example, provides the greatest foaming power of any known detergent, and *without* additives. It will eliminate the need for drying and degreasing controls in your formulation. It is *substantive*—gives a pleasant, soft "feel" to hair and skin, yet can be modified or plasticized as you wish.

"Duponol" XL gives shampoos true cosmetic elegance . . . a pale golden amber color that will not fade or discolor on display. And formulation involves only simple dilution plus thickening to desired viscosity.

We've made some unusual claims for "Duponol" XL. They weren't made lightly. We think the proof is simple: Write to us for a sample, then *wash your hands with it.* "Duponol" XL itself will do the convincing. E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Dyes and Chemicals Division, Wilmington 98, Delaware.

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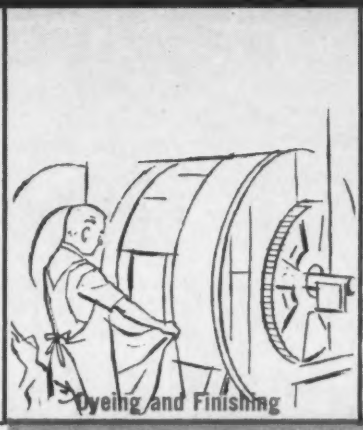

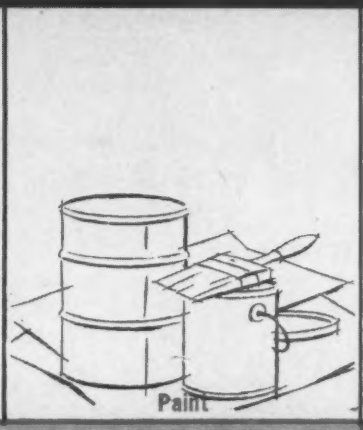

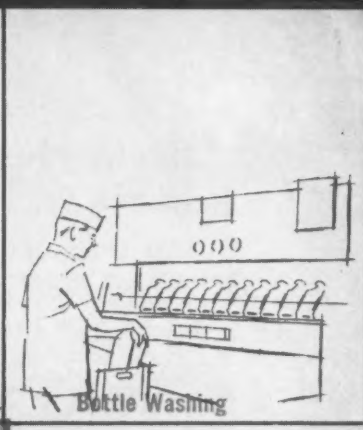

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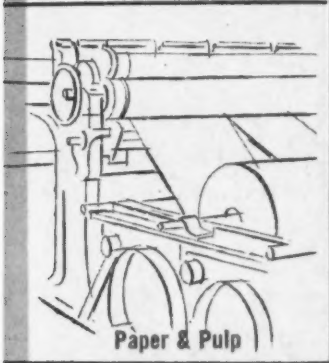
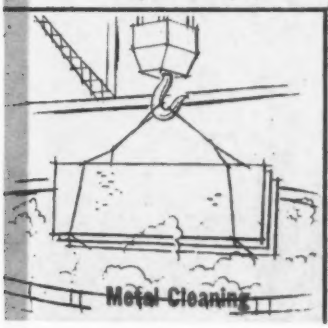
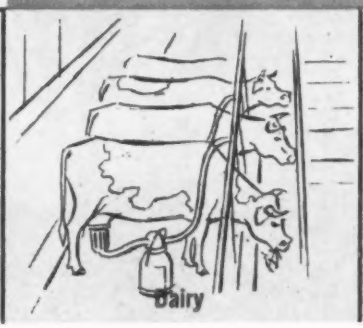
If you're compounding liquid or dried formulations of the alkyl aryl surface-active type, we suggest that you start with "the successful ingredient"

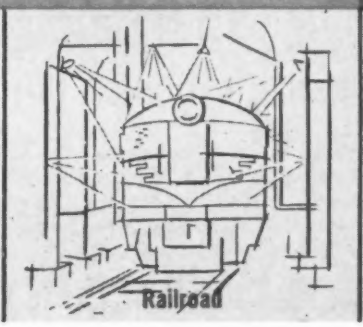
NEOLENE 400

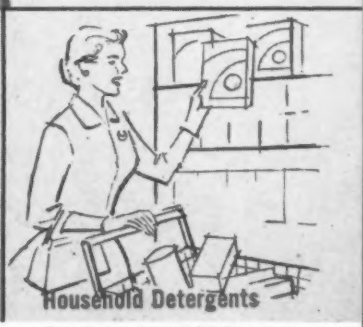
the basic raw material used by the foremost detergent processors











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OIL-SOLUBLE SULFONATES—manufactured by sulfonation of synthetically produced hydrocarbon under closely controlled conditions.

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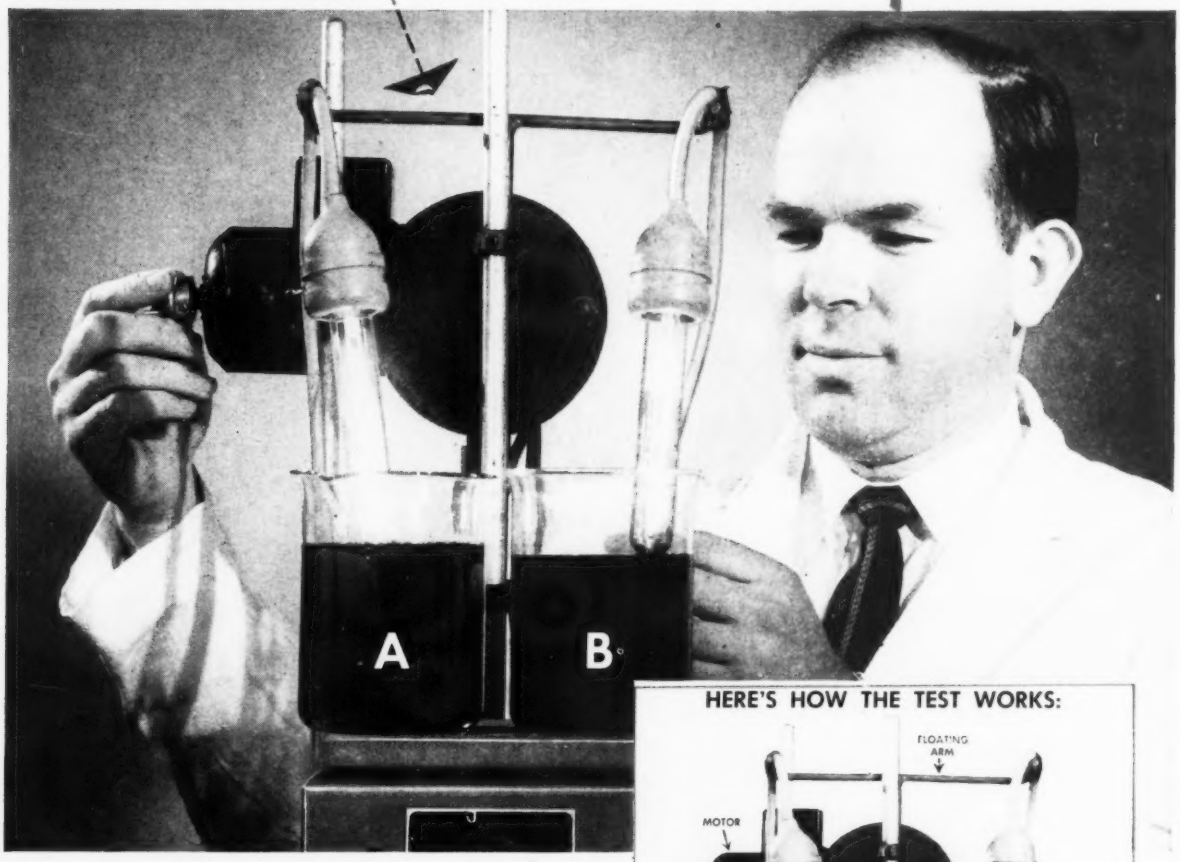
BEFORE YOU SWITCH TO A RED OIL SUBSTITUTE:

Make this simple test

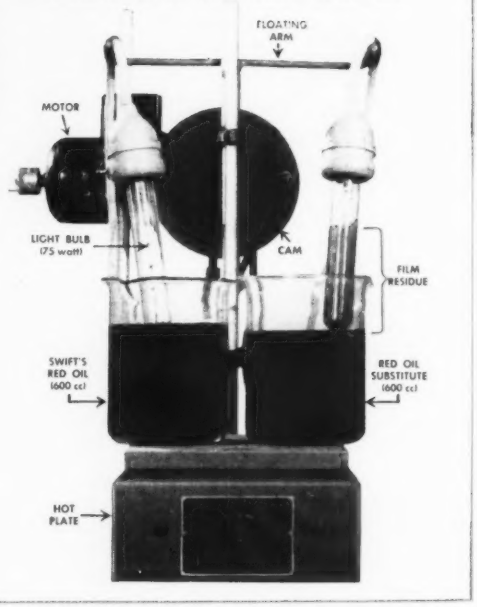


LIGHT BULB TEST proves the superiority of Red Oil!

Some red oil substitutes contain a higher percentage of polyunsaturates than found in red oil. In the presence of heat these materials tend to solidify . . . to form a gum residue. This characteristic may be desirable *if* you want a *drying oil*. But, if you have purchased a red oil substitute for reasons of economy, for an application where oxidation or polymerization is an undesirable factor, your economy may well be a compromise with the quality of your product.

A simple test, as shown above and explained at right, will show, by sight, whether or not the product you are now using leaves a gum deposit in the presence of heat. Place *any* red oil substitute in beaker "B" *but reserve the other* . . . for SWIFT'S Red Oil. Write for a trial order today and remember . . .

HERE'S HOW THE TEST WORKS:



Apparatus is arranged to subject lighted bulbs to continuous immersion and withdrawal from beakers over a period of several days. Hot plate should be set to maintain temperature of oil at about 250° F. Results of test will be visible. Oil which contains polyunsaturates will be revealed by build-up of film on the surface of the light bulb.

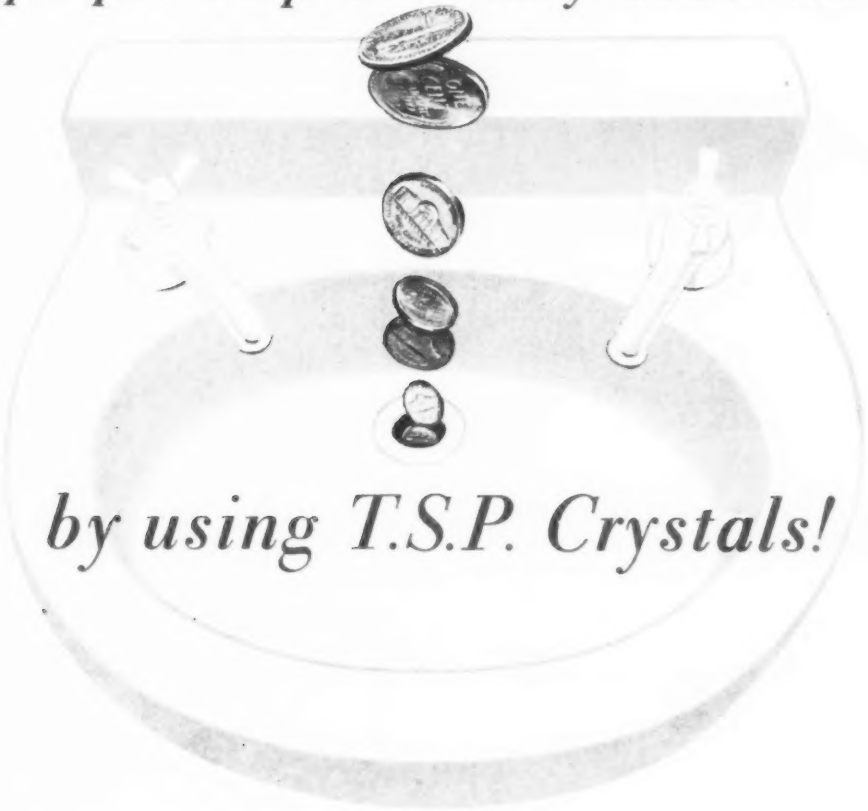
ONE TRIAL IS BETTER
THAN A THOUSAND CLAIMS

SWIFT & COMPANY
Technical Products Dept.
1834 165th St., Hammond, Ind.

Swift
102ND YEAR

To Serve Your Industry Better

some people do pour money down the drain



by using T.S.P. Crystals!

Let's admit at the outset—if you use T.S.P. crystals in a process where their special characteristics are *needed*—then this is not for you.

But if you *can* use Westvaco® T.S.P. Anhydrous *—you can save real money!*

Reason? T.S.P. crystals contain 130 lbs. of water for every 100 lbs. of anhydrous Na_3PO_4. That means you're paying freight on *more water than active material!* When you switch to Westvaco T.S.P. Anhydrous, your shipping costs will be 56% lower!

And that isn't all. Material costs will be lower too—more than $1.30 per 100 lbs. lower!

We'll be glad to send you a delivered-price quotation from which you can readily figure the dollar savings in terms of your own consumption and distance from shipping points. Stop pouring money down the drain. Contact your nearest Westvaco office today!

fmc®

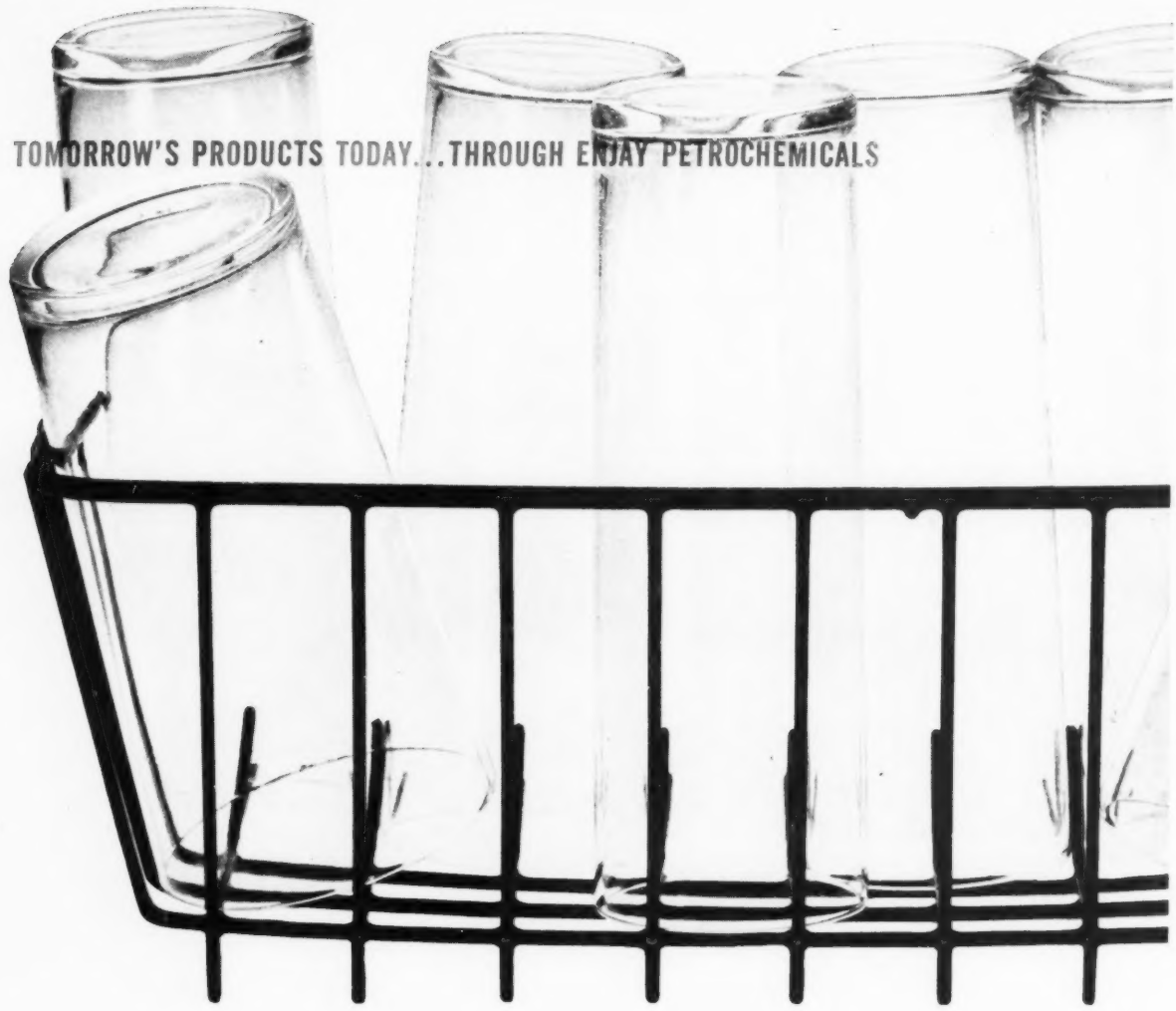
Westvaco Mineral Products Division

FOOD MACHINERY AND CHEMICAL CORPORATION

chemicals

161 E. 42nd St., New York 17 • Chicago Cincinnati Houston Philadelphia Newark, Calif.

BECCO® peroxygen chemicals • FAIRFIELD® pesticide compounds • FMC® organic chemicals • NIAGARA® insecticides, fungicides &c., industrial sulphur • OHIO-APEX® plasticizers and resins • WESTVACO® alkalis, solvents, phosphates, barium and magnesium chemicals



Basic raw materials for **DETERGENTS** that leave every glass with a "Crystal Sparkle"

There is solid sales-appeal in a detergent for home or restaurant use that leaves every glass with a "Crystal Sparkle." Marketing one of these new detergents will put new sparkle in your sales chart, too!

Every manufacturer of detergents should investigate Enjay Tridecyl alcohol, Tripropylene and Tetrapropylene—high-quality petrochemicals that can play key roles in the manufacturing process. These, and other Enjay petrochemicals, are making significant contributions in the manufacture of many products characteristic of the modern American standard of living.

The modern, well-equipped Enjay Laboratories have recently been expanded and are at your service in the application of any Enjay petrochemical. Call or write for further information.

Enjay offers a widely diversified line of petrochemicals for industry:

ALCOHOLS & SOLVENTS: Lower Alcohols, Oxo Alcohols, Ketones and Solvents; OIL & FUEL IMPROVERS: Detergent Inhibitors, V-I Improvers, Oxidation Inhibitors; CHEMICAL RAW MATERIALS: Olefins, Diolefins, Aromatics; ENJAY BUTYL RUBBER & VISTANEX.

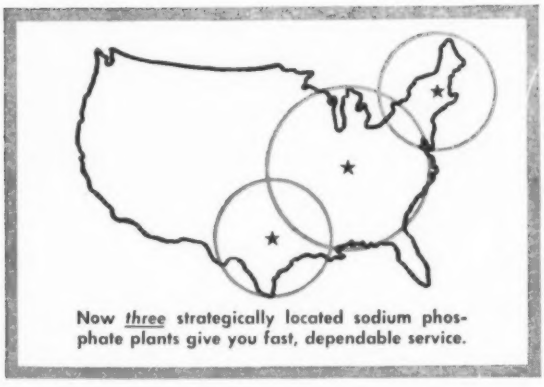
ENJAY

Pioneer in Petrochemicals

ENJAY COMPANY, INC., 15 W. 51st STREET, NEW YORK 19, N. Y. Akron, Boston, Chicago, Los Angeles, New Orleans, Tulsa

The sodium phosphate with your spray tower "built-in"!

SHEA Low Bulk Density SODIUM PHOSPHATES



Now *three* strategically located sodium phosphate plants give you fast, dependable service.

If you want to manufacture a light, fluffy product, Shea *low-bulk density* sodium phosphates can help you achieve it without spray drying.

Three years ago, Shea pioneered the production of spray-dried sodium phosphates—light, air-filled beads that occupy 60% more space than the same weight of conventional granules. Today Shea offers sodium phosphate users their choice—*either high density* (57-60 lbs. per cu. ft.) or *low-bulk density* (34-36 lbs. per cu. ft.).

If you use sodium phosphates—both high and low bulk density—count on Shea for products of unquestioned quality . . . in unfailing supply.

Sodium Tripolyphosphate
Tetrasodium Pyrophosphate
Disodium Phosphate
Trisodium Phosphate
Sodium Hexametaphosphate
Dicalcium Phosphate
Phosphoric Acids, Food and N. F. Grades
Phosphatic Feed Solutions
Organo Phosphorus Compounds
Elemental Phosphorus

SHEA CHEMICAL CORPORATION

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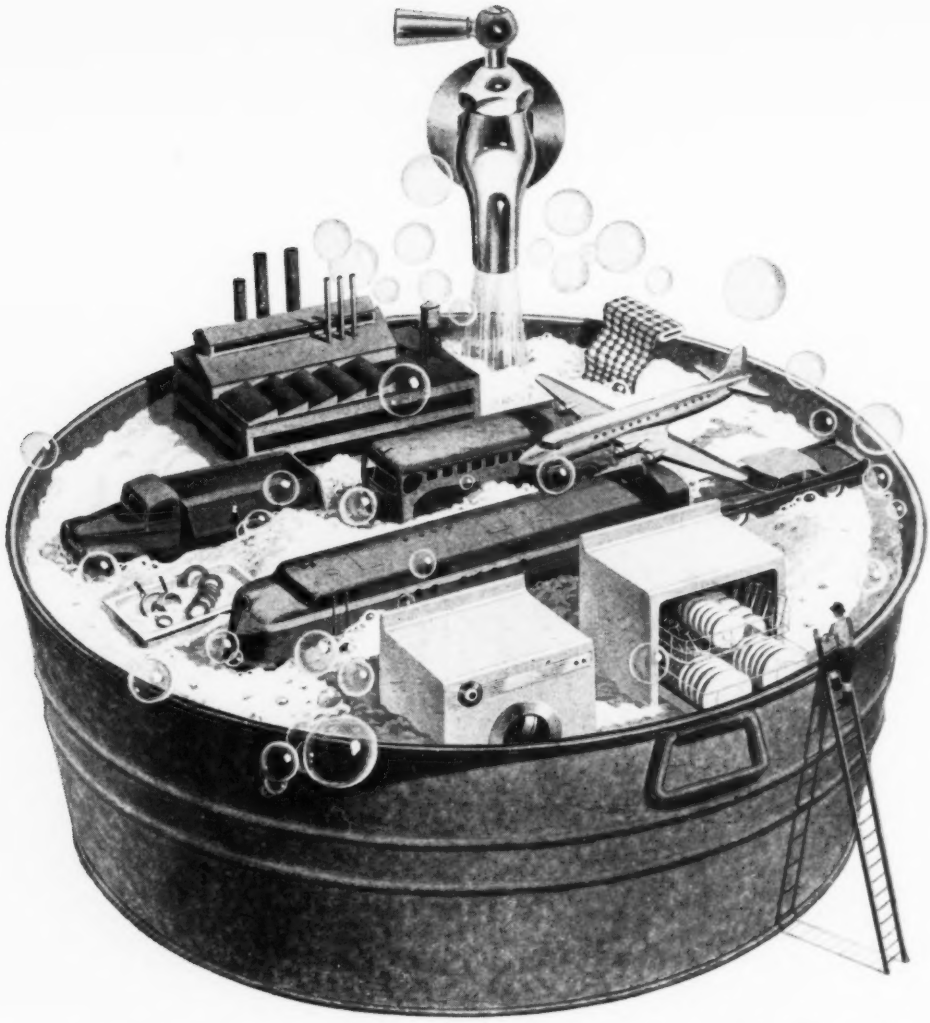
Jeffersonville, Indiana
Phone: BUtler 2-1381

EXECUTIVE OFFICE:
114 East 40th St.
New York 16, New York
Phone: OXford 7-4553



In just 10 years—with Oronite ALKANE* a 2,000 year custom has been washed away

For some 2,000 years "washing" meant only "soap." But in the short span of ten years the acceptance of synthetic detergents by the soap industry and consumers has seen detergents almost completely replace soap in the washing machine and dishpan. Oronite is proud to have played a major role in changing an established world-wide custom so quickly and completely.

The spectacular success of Oronite ALKANE, as the world's leading detergent raw material, has been due to Oronite's continuous multi-million dollar research, product development and manufacturing program coupled with application of large-scale continuous processing methods. This program has led to an imposing list of patents and has established Oronite ALKANE as the one standard of quality, the unduplicated raw material of the detergent industry.

Marketing the leading detergent raw material also brings a responsibility to the future. As in the past, millions of dollars are being invested in research and manufacturing facilities to assure that "you can expect from Oronite, whatever is new or better in detergent raw materials."

For the highest quality detergent raw material, or help on sulfonation processes, contact your nearest Oronite office.

*Trademark for detergent intermediate

ORONITE CHEMICAL COMPANY

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200 Bush Street, San Francisco 20, California

SALES OFFICES
450 Mission Street, San Francisco 5, California
30 Rockefeller Plaza, New York 20, New York
20 North Wacker Drive, Chicago 6, Illinois
Mercantile Securities Building, Dallas 1, Texas
Carew Tower, Cincinnati 2, Ohio
714 W. Olympic Blvd., Los Angeles 15, Calif.

EUROPEAN OFFICE
36, Avenue William-Favre, Geneva, Switzerland

4159

After Closing

Pace Joins P&G

Clint Pace, formerly executive assistant to the president of the *Houston Post*, has joined Procter & Gamble Co., Cincinnati, as assistant to the president. The appointment is effective July 15. Mr. Pace had been with the *Post* for 14 months. He came to Houston after 18 months in Washington as director of the White House Conference on Education.

★

Chemical Exposition Aides

E. R. Weidlein, trustee of the Mellon Institute, has been named as chairman of the advisory committee for the 26th annual National Chemical Exposition, it was announced recently. The show will be held in the New York Colesium, Dec. 2-6. The membership of the committee is as follows:

Roger Adams, head of chemistry department, University of Illinois; William S. Auchincloss, publisher, Oil, Paint & Drug Reporter; J. V. N. Dorr, board chairman, Dorr-Oliver, Inc.; R. P. Genereaux, engineering department, E. I. du Pont de Nemours & Co.; Norman Hackerman, president, Electrochemical Society; Raphael Katzen, chemical engineer; Sidney D. Kirkpatrick, editorial director, Chemical Engineering and Chemical Week; Walter E. Lobo, director of chemical engineering division, M. W. Kellogg Co.; Robert B. MacMullin, senior partner, R. B. McMullin Associates.

Walter J. Murphy, editor, Industrial and Engineering Chemistry; W. T. Read, general staff, department of the Army; Vincent L. Rebak, Grace Chemical Co., and president, Salesmen's Association of the American Chemical Industry; J. Henry Rushton, president, American Institute of Chemical Engineers; N. A. Shepard, consultant; Julian C. Smith, professor of chemical engineering, Cornell University; L. V. Steck, president, The Chemists' Club; E. K. Stevens, president International Exposition Co.; R. Gordon Walker, consultant; Roger J. Williams, president, American Chemical Society.

☆

Harding Joins Penick

Carroll W. Harding, Jr. has joined S. B. Penick & Co., New York, as a specialist in the sanitizing products department, it was announced recently by Frank Seeland, vice-president and department manager. Mr. Harding will be in charge of sales of "Heliogen," an

Carroll W. Harding, Jr.

iodine sanitizer. He previously was associated with Economics Laboratory, Inc., St. Paul, and Oakite Products, Inc., New York.

☆

Breck Wins SMI Award

John H. Breck, Inc., Springfield, Mass., was presented with the "Key of Achievement Award," by the Student Market Institute at that organization's fourth annual meeting held recently in New York. Robert M. Stelzer, SMI president, said that Breck had been selected because of its outstanding youth-and-educational advertising and promotion campaigns.

★

Borax Appoints Two

United States Borax & Chemical Corp., Los Angeles, recently announced the appointments of Richard F. Steel, as assistant general manager, and Donald S. Taylor, as vice-president in charge of research, respectively.

Mr. Steel joined Pacific Coast Borax in 1946 as assistant manager in charge of taxes and insurance. He was named controller in 1949 and secretary and treasurer last year when Borax merged with United States Potash Co. to form U.S. Borax & Chemical Corp.

Also originally with Pacific Coast Borax, Dr. Taylor served with the research department from 1945-'50, when he became research engineer. In 1955, he was appointed director of industrial research and last year was placed in charge of the research program of the newly-formed concern.

★

New Heyden Newport Plant

Construction of a new plant for manufacture of terpene alcohol esters was begun recently at Pensacola, Fla. by Heyden Newport Chemical Corp., New York. Terpene alcohol esters are primarily used in production of soaps, perfumes and plastics. The new unit is scheduled for completion late this year. The company will also manufacture menthyl acetate and neo-menthyl acetate for the first time at the Pensacola plant.

★

Fairfield Names Brett

R. Larry Brett has been named as Chicago district manager for the Fairfield Chemical Division of Food Machinery and Chemical Corp., New York. Mr. Brett formerly was a chemist with West Chemical Products Inc., Long Island City, N. Y. For a number of years, Mr. Brett served on the scientific committee of the Chemical Specialties Manufacturers Association, New York.

★

New du Pont Laboratory

The polychemicals department of E. I. du Pont de Nemours & Co., Wilmington, Del., recently announced that it soon plans to start construction on expansion of its sales and service laboratory at Chestnut Run, Md. The plant handles development of "Zerex" and "Zerone" anti-rust, anti-freezes, industrial chemicals and plastic products. Scheduled operations of the laboratory also include technical assistance to customers, design and testing of new applications, and development of new processing techniques.

Fluid Advances DeCarlo

J. J. DeCarlo has been named to the newly-created post of plant coordinator of Fluid

J. J. DeCarlo

Chemical Co., Newark, N. J., it was announced last month. Mr. DeCarlo formerly was director of purchases. In his new post, he will be in charge of coordination and development of Fluid's contract aerosol packaging facilities.

★

NYC Aerosol Shipping Law

A new regulation pertaining to the truck shipment of aerosol products through tunnels under rivers surrounding New York City has been promulgated and went into effect June 7, 1957. A change in the regulations was effected by an amendment to the rules laid down by the Port of New York Authority, which is responsible for the operation of the tunnels and other public transportation facilities. These rules are not to be confused with those of the Interstate Commerce Commission.

Amendment F to Supplement No. 1, Rules and Regulations Governing the Transportation of Explosives and other Dangerous Articles Through Vehicular Tunnels Operated by the Port of New York Authority, changes section 16 of supplement 1, dealing with "Compressed Gases."

Under the new regulation no vehicle may enter any tunnel if its load includes any pressurized vessel containing a combustible or flammable mixture, unless "such vessel or container be of metal, of 17.6 fluid ounces capacity or less, and have an absolute pressure of 75 pounds or less, and when so packed in an outside container the quantity in said load shall not exceed four thousand (4,000) pounds gross weight per vehicle."

Fluorinated hydrocarbons, propane, and isobutane, are included in a long list of compressed gases which are allowed passage through the tunnels only if packed "in a tube or cylinder two (2) inches or less in outside diameter and four (4) fluid ounces or less in capacity.

The Chemical Specialties Manufacturers Association expects to arrange a meeting with the representatives of the Port of New York Authority in connection with Amendment F.

★

Wittenberg Joins Powr-Pak

Powr-Pak, Inc., Bridgeport, Conn., custom aerosol loaders, recently announced the appointment of Jerome S. Wittenberg as national sales manager. In his new assignment, Mr. Wittenberg will be responsible for coordination and supervision of sales and sales promotion.

Previously he had been associated with A. R. Winarick, Inc., New York, and Diversified Sales Associates, Newark, N. J., where he was director of marketing.

★

Research Group Hears Mina

A discussion of the various methods of pressure packaging by Dr. Francis A. Mina, technical director of Lodes Aerosol Consultants, Inc., New York, was the highlight of the June meeting of Pharmaceutical Research Discussion Group, held at the Hotel Suburban, East Orange, N. J. The group consists of technical personnel of pharmaceutical companies located in northern New Jersey. Following Dr. Mina's talk, there was a question and answer period and a general group discussion at which time aerosol survey figures were studied.

Named to Civic Post

H. Bruce Hagler, president of Associated Brands, Inc., Brooklyn, N. Y., aerosol contract fillers,

H. Bruce Hagler

has been named to the board of trustees of the Jewish Hospital of Brooklyn, it was announced recently. Mr. Hagler has been active in Brooklyn civic and philanthropic activities for more than 20 years.

★

"Par-Busters" Golf Outing

The golf auxiliary of the Chicago Perfumery Soap & Extract Association will hold its second outing of the summer at Medinah Country Club, Itasca, Ill., Aug. 27 it was announced recently. The association also reported that its final outing of the season has been re-scheduled to Sept. 12, so as not to interfere with the Drug & Chemical September luncheon. It will be held at the Rolling Green Country Club, Arlington Heights, Ill.

★

Harris to Corn Products

Appointment of Howard F. Harris to the newly-created position of director of public relations of Corn Products Refining Co., New York, was announced recently by William T. Brady, president. Mr. Harris formerly was public information director of the Grocery Manufacturers of America, Inc. Corn Products manufactures a varied line of industrial and consumer products, including "Argo," "Linit," and Niagara starches, and "NuSoft" water softener rinse.

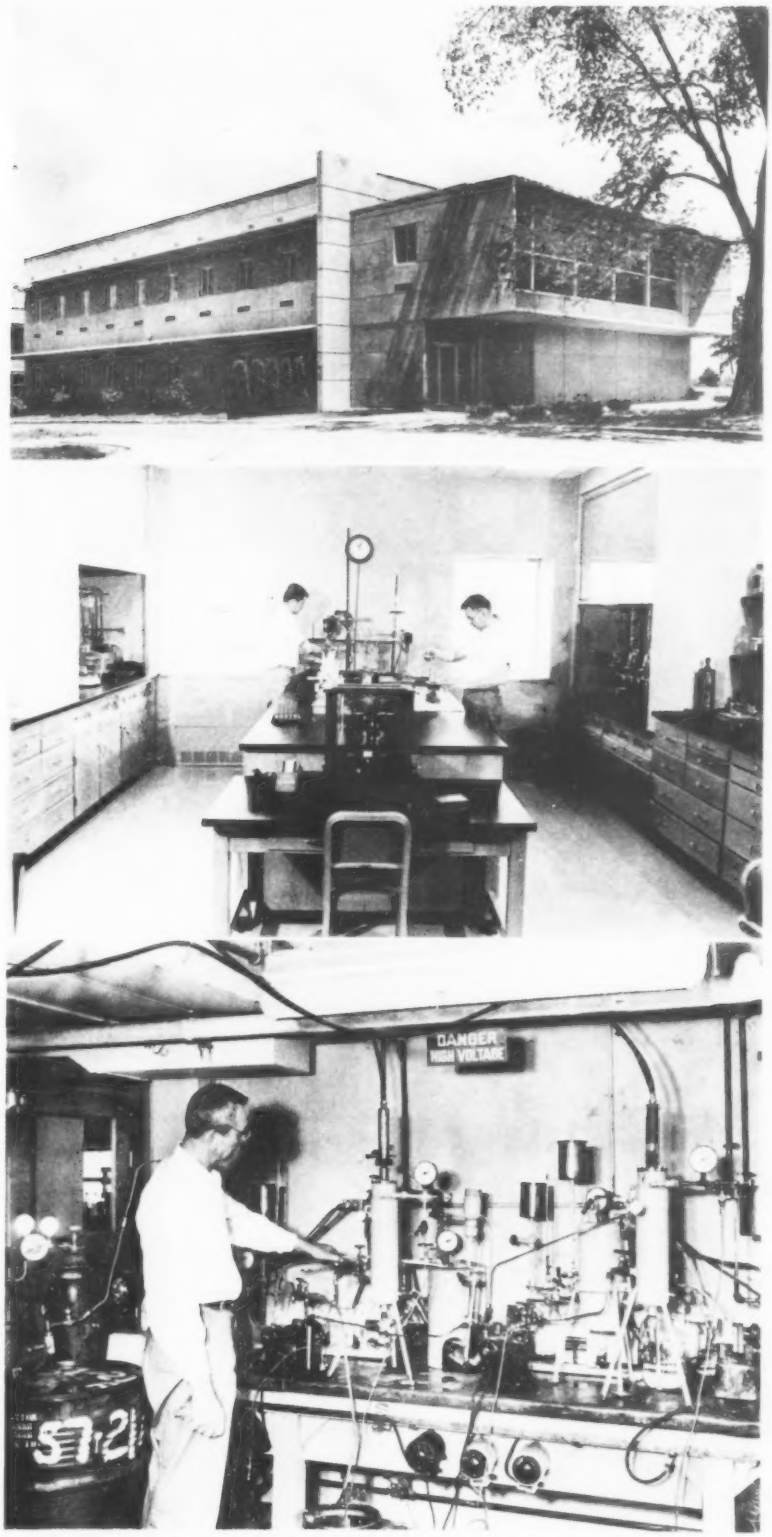
Petrolite Opens New Laboratory

THE completion of its new research laboratory at Webster Groves, Mo., was marked by Petrolite Corp., St. Louis, last month with an open house party. The modern structure, photographs of which appear on this page, houses research personnel of the Bareco, Petreco and Tretolite divisions of Petrolite. Petrolite manufactures microcrystalline waxes. Bareco, general office for which is in Kilgore, Tex., likewise produces microcrystalline waxes, as well as oxidized microcrystalline waxes and synthetic waxes.

The new Petrolite laboratory building is a three story, "L"-shaped structure with an enclosed floor space of approximately 29,000 square feet. The basic structure—floors, walls, roof, are of monolithic reinforced concrete construction, with trim panels of Roman brick on exterior walls. Interior walls are of plaster on steel lath. Ceilings are acoustical panels set in aluminum framing, with flush structural glass panels enclosing fluorescent lighting. Service piping is concealed behind furred ceilings and walls.

The building is completely air-conditioned by means of individual blower units in each room or laboratory.

Modern functional furniture and attractive decor have been incorporated into the building as a whole. Library furniture is of blond birch; laboratory furniture is white oak with resistant stone tops. Floors are vinyl tile. The lobby floor is of terrazzo with an abstract design depicting the company's functions in the petroleum industry. The lobby features an attractive suspended concrete stairway to the second floor.



New Petrolite Wax Research Lab: Top view is strikingly modern exterior of newly opened research laboratory of Petrolite Corp. in Webster Groves, Mo. A typical two-man laboratory is shown in center photograph. Bottom view shows a specialized refinery operation which is duplicated in miniature pilot plant scale. This makes possible accurate predictions of operating efficiency, processing unit size and treating rates. New lab will do research on microcrystalline and synthetic waxes produced by Petrolite and its Bareco Division for use in floor waxes and polishes.

Fluid Appoints Marzane

Richard D. Marzane, Jr., has been appointed director of purchases of Fluid Chemical Co., New-

Richard D. Marzane, Jr.

ark, N. J., it was announced last month by E. D. Bennett, president. In his new post, Mr. Marzane will have complete supervision of the company's purchasing requirements. Mr. Marzane previously was vice-president of Central Bank and Trust Co., Miami, Fla.

★

Installs Aerosol Line

Thomas F. Donofrio of Toledo, O., recently announced he had purchased the Miami, Fla., insecticide firm, Truly Nolen Products, Inc. At the same time Mr. Donofrio revealed that a modern aerosol loading line was being installed in the Miami plant. Patents on the machines are held by Aerosol Pak Corp., Toledo manufacturer and filler of aerosol products. Aerosol Pak was acquired by Mr. Donofrio and his associates in 1956. The Donofrio family has been active in development and manufacture of filling machines for the pharmaceutical industry since 1942.

The Nolen firm, which has been manufacturing and marketing insecticides for 15 years under the tradename of "TNT," sold all of its facilities to Mr. Donofrio. Purchase price was not revealed.

Lee R. Olmstead has been appointed director of national sales of Truly Nolen. He was formerly associated with Aerosol Pak Corp. Prior to that he served as purchasing agent for Kaiser-Frazer Corp., Willow Run, Mich.

★

Texas Enacts Two Laws

Sale of thallium compounds is prohibited by Texas House Bill 539, which became effective June 11, the day it was passed. The act makes it unlawful to sell rat poison, or any other preparation containing more than one per cent thallium (expressed as metallic) in the form of thallium sulfate or any other thallium compound. Several cases of accidental ingestion of these compounds resulting in death of children are referred to in the bill.

Labeling and sale of hazardous substances for household use are regulated by Texas House Bill 194, which becomes effective September 10, 1957. Exempt under this act are soap, products registered under the Federal Insecticide, Fungicide and Rodenticide Act, and products covered by the Food, Drug, and Cosmetic Act. Definition of the term "hazardous" is included and the type of labels required are specified. The Commissioner of Health of the State of Texas will issue regulations under this law, which will be made available in bulletin form by the Chemical Specialties Manufacturers Association.

New Pint Squeeze Bottle

The plastic container division of Continental Can Co., Chicago, recently announced develop-

ment of a new 16-ounce, oval polyethylene bottle. Said by the manufacturer to be the first pint squeeze bottle of this shape, it was adopted recently by the chemical division of Borden Co., New York, as a package for its all purpose glue.

★

Wilkinson in New Post

Election of Lawrence Wilkinson to the board of directors of Allied Stores Corp., was announced recently. Mr. Wilkinson is executive vice-president of glass and plastic operations of Continental Can Co., New York.

Vern I. McCarthy, Jr., right, vice-president of Vulcan Containers, Inc., Bellwood, Ill., recently completed six month tour of duty in Washington, D. C., as Deputy Director of the Containers and Packaging Division, Business and Defense Services Administration, U. S. Department of Commerce. He has now been named as a consultant to the agency. When Mr. McCarthy completed his active duty in Washington, H. B. McCoy, second from right, BDSA Administrator, presented him with a flag which had flown from the Capitol building. Congratulating Mr. McCarthy are Rep. Harold R. Collier of Illinois and Frederick H. Mueller, left, Assistant Secretary of Commerce for Domestic Affairs. Mr. McCarthy will serve as a volunteer authority for the Containers and Packaging Division.

whatever your AEROSOL product

FELTON

fragrances insure its success!

There is a whole new world of merchandising opportunities for cosmetics, household and industrial products, thanks to Aerosols. But . . . Aerosols present special problems of fragrance compatibility. That is where Felton's creative experience makes the big difference! Our perfume chemists and Aerosol technicians will adapt or custom-create the fragrance to meet the exacting requirements of your product and give it more sales appeal.

EXTRA ADVANTAGES OF FELTON'S AEROSOL PERFUME DIVISION

- Aerosol laboratory equipped with the most modern filling apparatus.
- Testing equipment for checking every component making up your Aerosol product.
- Extensive experience on problems of end odors and irritation factors.
- Samples of your perfumed preparation submitted in the actual Aerosol container ready for your evaluation.

CONSULT WITH US TODAY

FELTON CHEMICAL COMPANY, INC.
599 Johnson Avenue Brooklyn 37, N. Y.

SALES OFFICES AND PLANTS IN MAJOR CITIES, CANADA AND OVERSEAS

He divides by 3 to stretch triethanolamine dollars

(Loading superintendents put advanced methods to work)

"A dollar saved is a dollar earned." That's a rewarding axiom many Dow customers take advantage of.

One eastern cosmetic-maker, for instance, uses triethanolamine as an emulsifying agent, as well as diethanolamine and Dowanol® 50B. His requirements call for less than carload quantities, yet he buys at full tank-car prices.

It's just a matter of simple division: One of our loading superintendents makes use of a three-compartmented tank car! Thus, this one car takes on the triethanolamine, plus the two other chemicals, and carries all three to the customer at the carload quantity purchase price.

This isn't unusual. But it is typical . . . of the advanced methods and techniques that give Dow customers more for their money in many ways. For, large or small, the chemical user benefits from a forward-looking plan that is geared to tomorrow's needs . . . today. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. GD 819T-1.

YOU CAN DEPEND ON DOW

25th
ANNIVERSARY

1932 - 1957

America's Most Complete Line of Surfactants. You'll find Stepan offers not only the most complete line of surfactants but also surfactants that are produced to the very highest standards of quality and uniformity. Substantial economies may also be effected as Stepan's complete line makes readily possible mixed carload buying, giving you the advantage of carload prices on the individual items. We also can serve your requirements for custom ethoxylating.

A NEW BROCHURE SHOWS YOU THE MANY WAYS STEPAN CAN SERVE YOU. WRITE FOR A COPY.

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Fatty Alcohol Sulfates • Bulk Liquid Detergents • Alkylolamides • Foam Stabilizers • Alkylphenol Polyalkoxy Sulfates • Non-Ionic Detergents • Custom Ethoxylation • Alkyl Phenols

STEPAN
CHEMICAL COMPANY

News about

B.F.Goodrich Chemical *raw materials*

A 1% concentration of Carbopol 934, neutralized, converts glycerin into a clear, stable and highly viscous gel.

CARBOPOL 934

makes clear, stable glycerin gel

A mere 1% Carbopol concentration, after neutralization, turns glycerin into a clear, stable gel that is ideally suited for cosmetic and pharmaceutical formulations.

The stability of this gel toward aging is outstanding; that pictured here was a year old. It is also resistant to bacterial and fungal degradation.

Because Carbopol 934 is man-made, its purity and uniformity are consistent. It provides far higher viscosities at low concentrations than does any other thickening agent. Used with USP Glycerin, it produces non-irritating and non-allergenic gels that are evenly textured and very smooth in appearance and to touch.

Carbopol 934 is supplied as a white powder that is readily dispersed in both water and glycerin by mechanical action. For experimental samples and technical information, write Dept. KC-4, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Good-rite CHEMICALS

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

Nacconol® DBX

super-dense beads

first detergent ever

to combine <u>all</u>

of these features . . .

- ★ *40% active alkyl aryl sulfonate!*
- ★ *As dense as most flake materials!*
- ★ *Essentially dustless!*
- ★ *Free-flowing!*
- ★ *Non-caking!*
- ★ *More uniform mixtures!*
- ★ *Better-looking products!*

NACCONOL DBX is easier to handle in your plant, gives your detergent mixes more sales appeal. *Yet it costs no more than detergents in flake form!*

Send for a sample of NACCONOL DBX today.

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ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia Portland, Ore. Providence Richmond San Francisco Toronto

® NATIONAL ANILINE — Allied Chemical

P-1

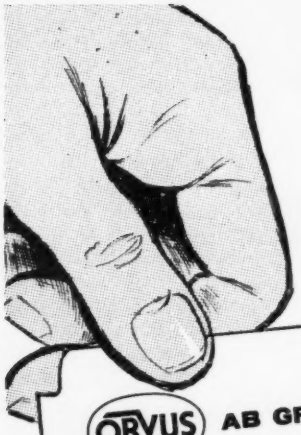
Without cost or obligation,
send a Nacconol DBX sample to:

NAME_____

POSITION_____

COMPANY_____

ADDRESS_____



THIS FILE OF PROCTER & GAMBLE SOAPS AND DETERGENTS BRINGS YOU

Top Performers for Every Formulation!

ORVUS AB GRANULES

A neutral synthetic detergent, wetting and emulsifying agent of the 40% active sodium alkyl aryl sulphonate type. A white, readily soluble free-flowing light granule, it can be used effectively in the blending of bubble baths, car washes, dishwashing compounds, dairy cleaners, insecticides, laundry detergents, rug and upholstery cleaners, and general maintenance cleaners.

ORVUS WA PASTE

A neutral synthetic detergent and wetting agent whose active ingredient is mainly sodium alkyl sulphate. Orvus WA has excellent sudsing, wetting, emulsifying, dispersing and penetrating properties which are well suited for paste and liquid shampoos, bubble baths, liquid detergents, liquid car washes, liquid floor cleaners, insecticides, glass cleaners, rug and upholstery cleaners and for many other liquid cleaners.

AMBER GRANULES

A neutral 88%, 42° titer-type soap of exceptional purity and uniformity. Well suited for the preparation of paste or gel-like products because of its high titer. Its granular form makes it ideal for powdered products. Excellent for the preparation of hand cleaners, paste cleaners, polishes, lubricants and coatings.

Kyro EO

A neutral nonionic synthetic detergent of the 100% alkyl-phenol ethylene oxide condensate type. A light-colored liquid with a clean, pleasant odor. Its superior detergent, wetting and emulsifying properties, plus its compatibility with a wide variety of other products, offer excellent performance in liquid detergents, sanitizer detergents, self emulsifying solvents, automatic laundry detergents, glass cleaners, insecticides, textile cleaners, dairy cleaners and bottle washing compounds.

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A medium titer, neutral white soap of exceptional purity and quality. Well suited for compounding products where a mild but effective soap is required —hand soaps, paints, polishes, protective creams, dishwashing compounds and paper coatings.

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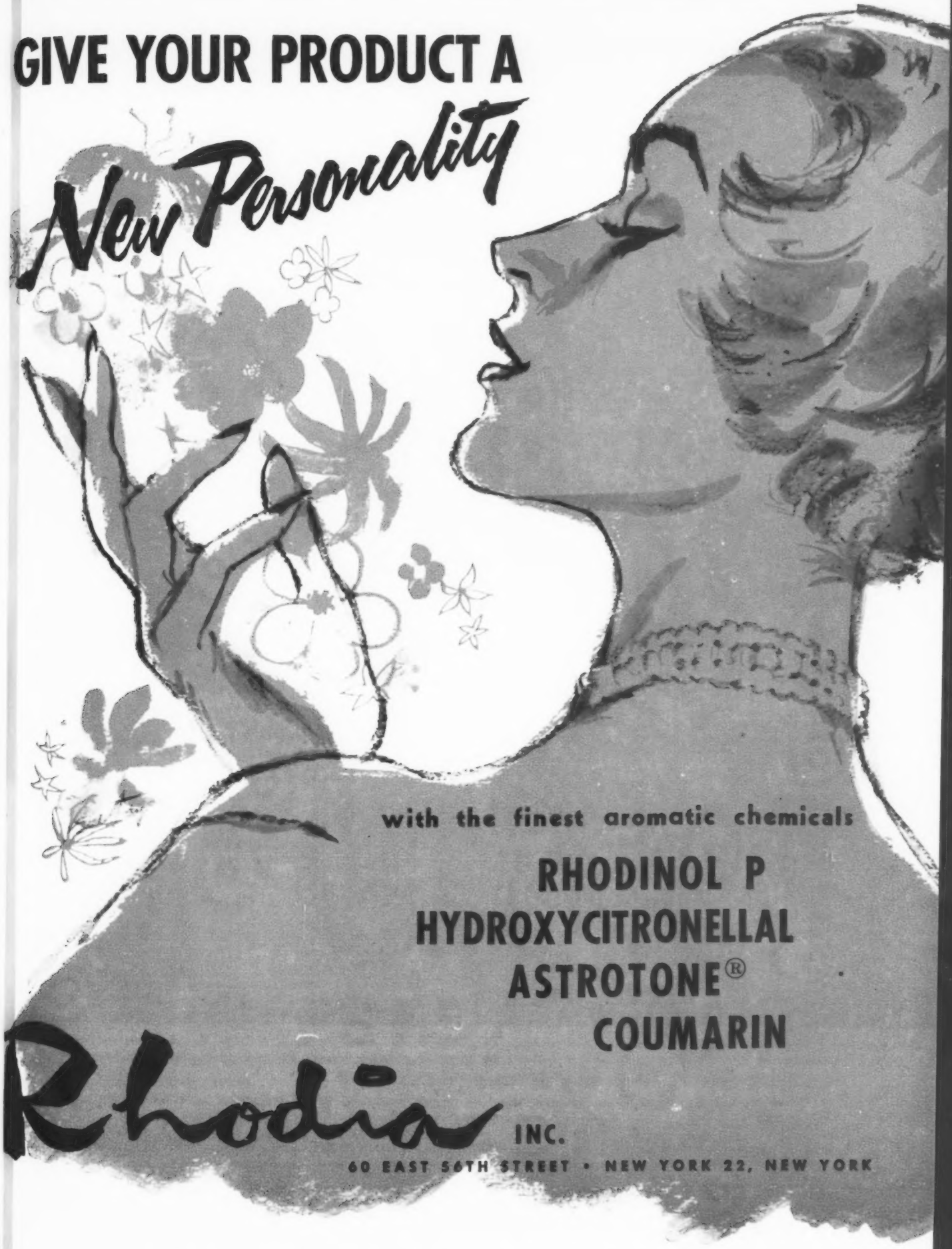

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. . . in brief

. . . as the editor sees it . . .

UNIFORMITY. . . . Taken as a whole, household chemical specialties, detergents, soaps, cosmetics on the market today are of fairly uniform high quality. The junk products of World War II days have faded from the picture. Of course, there is always a percentage of low grade products, usually marketed by the quick-buck boys, but obviously their number has declined steadily in recent years as competition for the householder's dollar has become keener.

Now, with so many products of uniform quality on the market, the whys and wherefores of Mrs. Mc Guff's choice of purchases become increasingly complex. The power of advertising looms ever larger in the sales picture. Price also enters the scene to a greater extent. And the package, both its size and design, takes on added importance. All are competitive factors which keep the marketer of household products scrambling like a cat on a tin roof.

Is it any wonder that research for something new and different has become a rat race. Anything to break away from the monotony of product uniformity and all the marketing headaches which it entails. Maybe customers will beat a path to the door of a better mouse-trap maker, but manufacturers don't seem to place too much stock in any such. The advertising and sales pressure stays on.

* * * * * *

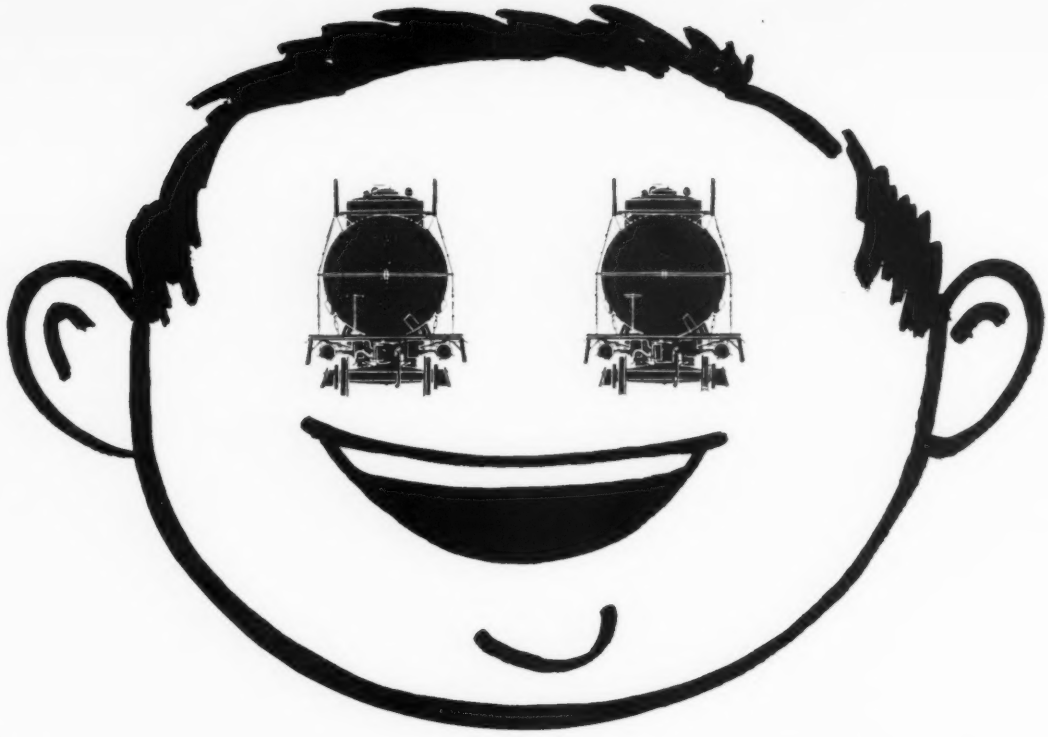
PARA. . . . For the past two years, the market situation in paradichlorobenzene has been completely unsatisfactory to practically everybody concerned. Para prices have been at low ebb for a long time. We doubt that any para producer is making money. In fact, we have good reason to believe that most, if not all, of them are losing money on every pound sold today. Obviously, this is an unhealthy situation which cannot continue indefinitely.

Strange as it may seem, the old-line packers and converters of finished moth and deodorant products are also suffering as a result of the current para market. Demand for the old standard retail brands has taken a nose-dive. They have run afoul of cut-throat competition the likes of which they have not known for many a year. New, cheap lines which well could disappear when and if the price of para goes up, have stolen the market. And even they cannot be making too much profit based on their known costs and selling prices.

No buyer anywhere can hope to obtain anything below cost indefinitely. Off hand, competitive dog-fights seem to present a wonderful opportunity for buyers. But in the long run, they pay the bill. So why try to kid ourselves? And the longer a bad market situation continues, the higher the price they will pay. The basic para market today is no exception. Eventually, buyers will pay the fiddler. Some are already paying,—and will continue to pay until para prices are stablized at realistic levels.

* * * * * *

LIABILITY . . . Like a vulture sitting aloft waiting for the carcass to rot, the product liability hound seems to be ever waiting his chance to slap a lawsuit on some unsuspecting manufacturer. If what we hear is true, the courts of the country are becoming flooded with damage suits, many of which are strictly phoney or closely akin thereto. For the unscrupulous operator and in many instances his equally unscrupulous lawyer, the product of any manufacturer is fair prey. Probably, it was ever thus. But of late, there seem to be more and more of these obviously thin cases going to the courts.



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Where a product is of chemical nature, it is particularly vulnerable to both bodily injury and property damage claims. The mere term, "chemical," seems to invite damage or injury, real or imaginary. Many manufacturers carry products liability insurance, but one and all are anxious to avoid publicity whether the case against them is justified or not. And for those who are insured, the insurance companies are interested primarily in "getting off the hook." As a consequence, many unjustified claims are paid off.

Maybe the worm has turned. Maybe the number of far-fetched product liability claims is mounting too high even for the insurance companies. Maybe that's why more of them are getting into court.

* * * * *

TOO MANY . . . We sent a shopper out into the streets with instructions to visit a few leading New York stores and purchase a new, widely-advertised chemical specialty. In no case did she find the product stocked by the stores. But that was not the really significant part of the deal. It was the attitude of the sales clerks in the stores, part bewilderment, part resentment. Everybody is asking for some new product, always something new, something they don't stock and don't have room to stock. Already they have all the new items which they can afford to stock and are forced to get rid of old items to make room for the new. But for every new item added, the public seems to call for four or five other new things. And it's all driving the sales clerks stark, raving mad!

Obviously, too many new chemical specialties are being sent to market. The chemical fellows are getting almost in a class with the food people with a new this or that almost daily. The stores, supermarkets, et al, are simply being snowed under. They don't know where to draw the line or what old items to eliminate to make room for new ones. In fact, retailing has become pretty much a nightmare, a nightmare of new products.

As time goes on, it would seem that any new product that does not go to market under a full head of advertising and sales steam is doomed to languish by the wayside. The competition of new products just to make the store shelves has become as keen as a razor and is getting worse. And in stores which have clerks, the resistance to this never ending stream of new items grows apace. And it's all something to think about before just willy-nilly dropping that new product into the mad retail marketing whirl of today.

* * * * *

DOG-EAT-DOG . . . We hearken back some eight or ten years to the days when a top politician in Washington girded up his loins and prepared to joust with the "great soap trust." He waved the flag, stood squarely behind motherhood and the sanctity of the home and vowed that Mrs. McGuff, the downtrodden American housewife would be freed from the shackles of the soap trust. The presidential bee was buzzing in this bloke's cranium and he figured this as as a first stepping stone toward that end. But his beautifully laid plan collapsed when he found out after careful investigation that there was no soap trust. So our publicity-seeking politico turned to exposing crime and did pretty well for himself, including numerous appearances on television. He got himself nominated for high office, not quite the presidency, but almost, but never did get elected.

All of which was recently brought rather strongly to mind by the remark of the head of one of our larger and well-known soap companies. "The soap business is the most viciously competitive, dog-eat-dog business in the world" was his summary of the marketing picture in detergents and soaps today. He admitted that he was proud of his own company merely because they could "stay with" the competition in soap selling at present and keep going. He concluded: "It must show that we're pretty good too!"

* * * * *

COLOR . . . The emphasis on color, not alone from the esthetic, but from the sales standpoint, as well, is not being overlooked by the soap industry. Gone are the days when the whiter the soap the better. Today, it's got to have color. Whether pink, gold, green, blue yellow or tan, there's a soap to match the shade of Mrs. McGuff's bathroom fixtures. Liquid detergents not missing a bet in their battle with powders, are coming to market in bright new shades. All of which marks another twist in the revolution that's been taking place in the soap business in the past decade or so.

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as the reader sees it . . .

Ratings Berated

Editor:

I am quite surprised to note an erroneous and therefore misleading news item that appeared on page 190 of your March issue, entitled, "'Pax Rated Superior'". Its lead paragraph states: "'Pax' pharmaceutical grade waterless skin cleaner was the only product to receive a rating of 'superior' in a recent report on the 'Evaluation of Waterless Skin Cleaners' prepared by the U. S. Public Health Service".

This statement is false in two respects . . . 1.) In table 2 "Overall Performance of All Cleaners Evaluated in Descending Order of Best to Poorest"), on page 56 of the report, there were in fact three products — not only one — that were rated as "Superior" and; 2. Instead of "Pax" (Code G-7) being rated first, it was my cleaner — Coded W-23 — "Scriptoil" liquid hand cleaner, which is shown as a conventional type cleaner, that was rated first according to over-all performance . . . The table clearly states that it is made up in descending order of best to poorest.

I trust that, inasmuch as the item in your journal was presented as a news item, you will see that there is a correction made.

As I further notice that the news item gave a description of "Pax", I feel that you and your readers would like to know something about "Scriptoil". The latter is a liquid hand cleaner which has several unique qualities: It has gained rapid recognition due to its ability to remove the hard-to-remove substances from the skin, quickly and efficiently, and without irritation. It does so merely by intermixing the cleaner in with the soiling substance and then rinsing off the mixture with cold or lukewarm water.

I have enjoyed reading your journal for some time, and am sure that in fairness you will correct this misleading article.

R. STRUZZIERY, *Treasurer*
Scriptoil Laboratories
Boston

Reginald Gildner of Davies-Young Soap Co., Dayton, O., presents Buckeye Co-op achievement certificate to Rudolph Ramelli, Inc., New Orleans sanitary supply jobbing firm. Ceremony took place recently in the directors' room of the New Orleans Athletic Club. The award, signalizing membership in the national family of Buckeye Co-op Distributors, was presented following a testimonial dinner for which Davies-Young was host. The Co-ops extend through the U.S., Canada and Latin America. Davies-Young organized the Co-op Achievement certificate. Present were E. J. "Manny" Guillot, general manager and promoter of the janitorial division of Rudolph Ramelli, Inc.; Rudolph Ramelli, president; Calvin Doell, vice-president in charge of purchases; Salem David, assistant purchasing agent; Armand Serpas; George W. Charlton, William Raines and William Steibing.

In a strictly literal sense, Mr. Struzziery is right. Two conventional cleaners, W-23 and F-6, in addition to G-7 were rated superior in table 2 of the report covering "all cleaners". However, only G-7 was rated superior in table 1 of the report. Table 1 dealt with performance of waterless hand cleaners only.

In the abstract, appearing on page iii of the report, the following sentence appears: "Among 15 waterless cleaners studied by laboratory and field evaluation technics, one cleanser of the wetting agent-solvent type (I, III) was found to be superior . . ."

Probably our lead sentence on the news item referred to should have made it clearer that there was only one waterless hand cleaner rated superior. However, because the report was a study of waterless hand cleaners and the product rated superior was a waterless hand cleaner, we thought the inference was clear.

Mr. Struzziery's product is not a waterless hand cleaner since it is to be rinsed off with water, as he points out in his letter. ED.

★

Israel Soap Figures

Editor:

In reference to the article in the March issue of *Soap and Chemical Specialties* entitled "World Consumption of Soaps and Detergents," I would be obliged if you would add to the list of soap and detergent consumption of the various countries, the following 1956 figures for Israel.

Population	1,855,000
Total use in metric tons	
Household soap	9,105
Toilet soap	1,765
Soap powders	1,086
Synthetic powders (15 per cent active) ..	1,772
Liquid detergents (12 per cent active) ..	8,118

According to the above figures the annual use per capita is about 25.3 pounds.

I. Mazur, Director
Food Division
Ministry of Commerce and Industry
State of Israel
Jerusalem

★

Ciba N. Y. Concern

Editor:

We note that on page 91 of the April issue of *Soap and Chem-*

(*Turn to Page* 99)

An Advance in Stability

GIVAUDAN'S MENTHANYL ACETATE!

Menthanyl Acetate, Givaudan's new perfume ester, is the latest contribution to the development of stable perfumes for soaps, detergents and cosmetics.

Coupled with its unusual stability, Menthanyl Acetate has a clean, refreshing odor with good strength and body which makes it an ideal aromatic for many popular types of perfumes. Practical to use, domestically produced Menthanyl Acetate is moderately priced and readily available.

Although Menthanyl Acetate lends itself well to the creation of many bouquets, its use in artificial bergamot, petitgrain, and lavender is specifically suggested by its resemblance to linalyl acetate.

Samples and our technical data sheet are available upon request.

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Potash soaps
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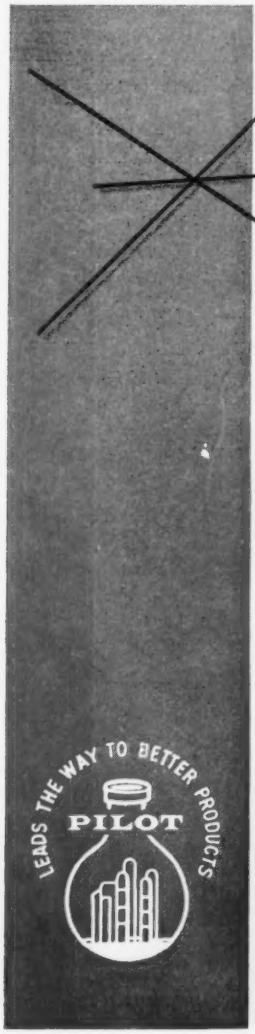
Shampoos
Shave products
Soap powders
Starch
Steam cleaners
Medicinal soaps
Textile detergents
Toiletries
Toilet soaps
and other detergent
and soap products

Dr. Alfred Ofner, director of technical development for Hoffmann-La Roche Co., Nutley, N. J., heads a group of scientists working on new aromatic chemicals for soap perfuming. How this well-known pharmaceutical firm, a producer of "vitamins by the ton" got into aromatics is told in story beginning on page 48.

PILOT

ABS-99

SULFONIC ACID



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COLD PROCESSING!

Cold Processing in the sulfonation of alkylbenzene below freezing produces this exceptionally pure Sulfonic Acid. Pilot's high purity Sulfonic Acid opens a new field for chemical standards and specialties. Oil or water dispersable products can be made directly by mixing Pilot ABS-99 with a variety of bases and solvents. Formulations for liquid detergents, industrial cleaners, metal stripping agents and heavy duty liquids can be made more effective . . . *and manufactured at a lower processing cost* by using Pilot's ABS-99 Sulfonic Acid, containing less than 1% Sulfuric Acid.

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HD-90 Flake
Dodecyl Benzene Sulfonates
Sodium Toluene Sulfonate

Detergents Based on Tall Oil

Tall oil-ethylene oxide condensates combine good detergency and low foam characteristics with economy in cost

By W. B. Satkowski and W. B. Bennet*
Monsanto Chemical Co.
Inorganic Chemicals Division
Everett, Mass.

THE quality of tall oil has been improved and the range of its applications greatly extended as a result of the needs created by the fat shortage during World War II. A by-product of the "Kraft" paper making process, tall oil was recovered mainly for its fuel value prior to its development as a chemical raw material. Today the United States is the world's leading tall oil producer.

This study is concerned with the preparation and properties of nonionic surface active esters produced by condensation of ethylene oxide with fatty acids or tall oil. Emphasis is placed on the derivatives of whole tall oil because of their commercial importance.

Most of the tall oil used for ethoxylation is whole tall oil which has been purified either by distillation or by acid refining. These upgrading processes remove color bodies which would reduce the quality of the final product if allowed to remain in the starting material.

Exact composition of purified tall oil varies with climate, geography, seasons, and method of purification. A typical purified whole tall oil might have the approximate chemical composition shown in Table 1.

Whole tall oil (distilled or refined) is a very economical source of unsaturated fatty acids for ethoxylation purposes. Some suppliers of tall oil-ethylene oxide condensates are Monsanto Chemical Company ("Sterox" CD), Atlas Powder Company ("Renex" 20), Blockson Chemical Division of Olin Mathieson ("Teox" 120) and Armour and Company ("Energetic"). These are water-soluble products designed for detergent uses.

Table 1. Approximate Chemical Composition of Refined Tall Oil

	Approx. %
Fatty acid, total %	55-65
Oleic acid	50
Linoleic (non-conjugated) acid	35
Linoleic (conjugated) acid	10
Palmitic acid	5
Unsaponifiable matter	5- 8
Rosin acids, total %	30-40
Abietic acid	30-40
Neoabietic acid	10-20
Dihydro abietic acid	14
Tetrahydro abietic acid	14
Dehydro abietic acid	5
Dextro pimaric acid	8
Isodextro pimaric acid	8

In addition to these tall oil-ethylene oxide condensates, a number of materials are marketed which are polyoxyethylene esters of various other organic acids derived from natural products, including the separated rosin acid and fatty acid portions of tall oil itself. Several of these products have properties similar to those of distilled or refined tall oil derivatives. Others have solubility properties which make them useful as emulsifiers. As a group these products are more expensive than those derived from tall oil but not as expensive as some other types of nonionic surfactants. Products in this category include Armour and Company's "Ethofats" and Atlas Powder Company's "Myrj."

In the remainder of this paper, attention will be focused primarily on products derived from whole tall oil (refined or distilled).

Physical Properties

TALL oil-ethylene oxide condensates are liquids and vary in color from a yellow to a brown. They have a mild fatty odor. The present commercial products contain about 95-100 per cent active material – the remainder being principally water. These products are completely miscible with water at room temperature, usually giving turbid solutions. Over a certain concentration range in water, a gel may be formed, a property which is characteristic of many nonionic detergents. Typical physical properties of these tall oil derived nonionic surfactants are given in Table 2.

Tall oil-ethylene oxide adducts exhibit marked stability to metallic cations usually encountered in hard water. Thus these products have a distinct advantage

* Paper presented at the 43rd midyear meeting, Chemical Specialties Manufacturers Association, Chicago, May 21, 1957.

over anionic and cationic surface active agents. In the presence of unusually high concentrations of various salts, the surfactant may be partially "salted out" to give a more turbid solution but this turbidity is not a precipitate and the functional properties are not noticeably impaired.

The amount of ethylene oxide present in a tall oil or fatty acid adduct affects the physical properties! A high ratio of ethylene oxide to tall oil will give products which have melting points as high as 50°C. or above.

Chemical Properties

CHEMICALLY the polyoxyethylene esters of tall oil may be represented by the following generic formula:

$RCOO\ (C_2H_4O)\ x\text{-}_1\ C_2H_4OH$

where x denotes the number of moles of ethylene oxide added to one mole of tall oil. Since tall oil is composed of a mixture of a number of carboxylic acids and some inert material, a mole of tall oil is considered as the amount required to neutralize one equivalent weight of a strong base.

From the generic formula it can be seen that there are two functional groups capable of chemical reaction; namely, the carboxylic ester linkage and the terminal hydroxyl group. The hydroxyl group is capable of undergoing such chemical reactions as esterification, sulfation and chloromethylation where conditions of the reaction do not tend to cleave the ester linkage.

The ester linkage in this type of nonionic surfactant is not a typical one. Since tall oil is a mixture of rosin acids and fatty acids, the ethylene oxide condensates derived from tall oil, have the characteristics of esters of both types of acids. The rosin acid esters can be saponified only under very strongly alkaline conditions and high temperatures, whereas the fatty acid esters are split under milder conditions of temperature and alkali. In the absence of heavy metal cations (i.e., in soft water) this condition does not markedly affect its detergency but in hard water the resultant soaps could tend to precipitate.

Certain tests conducted in our laboratory show that the polyoxyethylene esters of tall oil are nonetheless markedly stable under saponifying conditions. There is no noticeable decomposition when the product is submitted to 15 minutes boiling in either 10 per cent sulfuric acid or 25 per cent sodium hydroxide. Continued treatment, particularly with the strong alkali, would of course lead to saponification. The mild oxidizing agents usually encountered in laundry bleaching operations do not measurably affect the properties of ethylene oxide adducts of tall oil.

Functional Properties

FOAM Height: The test most frequently used in the laboratory for comparison of foaming power of surfactants is that of Ross and Miles. The foam height of the tall oil-ethylene oxide condensates as measured by this test is quite low. An increase in temperature has no marked effect on the foam height.

The low foam shown by the Ross-Miles test correlates well with the low sudsing encountered when the product is used in actual practice. The presence of builders as for instance in heavy duty detergent formulations does not interfere with the low foaming characteristics. This low foam is a distinct and important property of tall oil-ethylene oxide condensates. Very few members of the other types of nonionic surfactants available produce foam values as low as the tall oil-ethylene oxide adducts. Ross-Miles foam heights for three tall oil-ethylene oxide condensates are given in Table 3.

For the purpose of comparison, it should be noted that the Ross-Miles values at 25°C. for polyoxyethylene ethers of alkyl phenols and alcohols are generally in the range of 8-10 cm. and the alkyl aryl sulfonates and other anionic detergents often have foam heights of 16-20 cm.

Further addition of ethylene oxide to a specific tall oil-ethylene oxide condensate will increase the foam height slightly. Foam height of ethylene oxide condensates of straight chain fatty acids in the C_{16}-C_{18} range are comparable to those obtained from tall oil with the same number of moles of ethylene oxide.

Cotton Detergency

ESTABLISHMENT of a satisfactory measure of the comparative detergent properties of surfactants presents many problems. A standard fabric, standard soil and soiling techniques, standard mechanical washing action, a

Table 2. Range of Physical Properties of Typical Tall Oil-Ethylene Oxide Condensates

Physical state	Yellow-brown liquid	
Odor	Mild, fatty	
Pour point, °F. (ASTM D-97-47)	30–55	
Flash point, °F. (Cleveland open cup)	525-550	
Fire point, °F. (Cleveland open cup)	600-650	
Refractive index at 25°C.	1.470-1.480	
Specific gravity at 25°C.	1.06 -1.07	
Viscosity, centipoises at 25°C. (Brookfield viscosimeter)	200-400	
Surface tension, dynes/cm at	25°C.	50°C.
1.0% concentration	38.0 — 42.0	35.0 — 38.0
0.25% concentration	39.0 — 42.0	36.5 — 37.5
0.0625% concentration	41.0 — 43.5	37.0 — 38.5
Interfacial tension, Nujol, dynes/cm at	25°C.	50°C.
1.0% concentration	5.5 — 8.5	2.9 — 5.5
0.25% concentration	6.0 — 9.0	3.4 — 5.5
0.0625% concentration	7.0 — 9.5	4.5 — 6.5
Spreading coefficient at	25°C.	50°C.
1.0% concentration	— 9.5 to —16.0	—3.6 to — 8.8
0.25% concentration	—11.0 to —16.0	—5.7 to — 8.1
0.0625% concentration	—13.4 to —18.3	—7.0 to —10.4

Table 3. Ross-Miles Foam Height in Centimeters (0.10 Percent Concentration of Surfactant)

Nonionic	A	B	C
In 300 ppm water hardness and 25°C.:			
At once	2.8	4.7	2.9
After 5 min.	2.3	3.7	2.6
In 300 ppm water hardness and 50°C.:			
At once	2.8	—	—
After 5 min.	2.2	—	—

measurement of soil removal, and techniques for the correlation of the test results with practical results must be developed. A discussion of these factors is beyond the scope of this paper.

The test method used in our laboratory for detergency evaluation is that reported by Harris*. Detergent efficiencies are reported in terms of percent effectiveness of soil removal in comparison with sodium lauryl sulfate, a standard commercial detergent active material.

Most of the tall oil-ethylene oxide surfactants are built with various inorganic salts if intended for detergent use. The concentration of active in these formulated products varies from 10-20 per cent. Table 4 shows the detergent efficiency of three commercial tall oil-ethylene oxide condensates when formulated with 15 per cent active and 85 per cent builders and inorganic salts.

If a tall oil-ethylene oxide condensate containing just sufficient polyoxyethylene units to make it water-soluble is reacted with more ethylene oxide, the resultant product shows a slightly improved detergency and a slightly higher foam height. However, an optimum detergency level is reached quickly when further addition of ethylene oxide does not give improved detergency. A similar relationship exists with condensates of straight chain fatty acids.

* Harris, J. C., "Detergency Evaluation and Testing," p. 94, Interscience Publishers, Inc., New York, 1954.

Table 4. Launder-Ometer Detergent Efficiency of Built Tall Oil-Ethylene Oxide Nonionics (0.2% Concentration and 140 F)

(Sodium lauryl sulfate = 100)

Nonionic	50 ppm water hardness	300 ppm water hardness
A	114 ± 8	112 ± 8
B	114 ± 8	122 ± 8
C	114 ± 8	119 ± 8

Wetting and Rewetting

A TEST frequently used to evaluate wetting speed is that of Draves and Clarkson. The tall oil-based nonionics, like most other fatty acid-ethylene oxide condensates, are generally poor wetting agents. The further addition of ethylene oxide to either tall oil or fatty acid does not appreciably affect their wetting speed. Table 5 gives the Draves-Clarkson wetting times for three commercially available tall oil-ethylene oxide condensates.

Rewetting is a property allied to wetting but by no means parallel to it. Good wetting agents are not necessarily satisfactory in rewetting. No fully satisfactory test has been developed for measuring rewetting characteristics. However, the tall oil nonionics have been shown to have good rewetting properties in the paper field.

Emulsification

THE uses of emulsifiers are so varied that no given test is completely applicable to all applications. Comparative solubility of the surfactant in the aqueous and oil phases to be emulsified (the "hydrophilic-hydrophobic balance") plays a large part in the effectiveness of the surfactant as an emulsifier for the system under consideration. However, in general, the tall oil-based nonionics are useful in systems involving aromatic solvents and chlorinated hydrocarbons.

Table 5. Draves-Clarkson Wetting Time in Seconds (Neutral Solution and 25° C)

Nonionic	Surfactant Concentration 0.500%	0.250%	0.125%
A	58	180+	—
B	180+	—	—
C	80	110	80+

Uses and Comparisons

TALL oil-ethylene oxide nonionic surfactants were the base material used in the first domestic low-sudsing detergents and consequently their major development has centered around this application. Their low-foam characteristics are desirable also in many industrial and laundry operations. The fact that they are the lowest cost nonionic surfactants for detergent usage combined with good performance and low foam should make the tall oil nonionics one of the most attractive nonionic detergent actives on the market today.

In the field of textile processing the tall oil-based surfactants have found uses dependent on their good lubricating, emulsifying and detergent properties. Their emulsifying ability also gives them a position in the growing field of agricultural pesticide emulsions.

Tall oil-ethylene oxide nonionics are being incorporated into formulations for the following detergent uses:

1. All purpose Household detergents.
2. Mechanical Dishwashing Detergents.
3. Hand Dishwashing Detergents.
4. Wall and Floor Cleaning Detergents.
5. Metal Cleaning Detergents.
6. Rug Cleaning Detergents.

★

New Bradley Office

Bradley Container Corp., Maynard, Mass., has opened a new sales office in Philadelphia to serving Delaware, Pennsylvania and southern New Jersey. Bradley is a subsidiary of American Can Co., New York. The new office is located at 1 Wynnewood Rd., Wynnewood.

Evaluation of whitening efficiency of

Fluorescent Whitening Agents

By Eugene Allen

American Cyanamid Co.
Bound Brook, N. J.

MOST manufacturers and users of fluorescent whitening agents need an accurate method of evaluating the efficiency of these products. This need is mainly felt in comparing whiteners of different types against each other, a task which constantly confronts the soap and detergent manufacturers in their search for improved fluorescent whitening agents. This paper describes methods of evaluation now in use, and discusses their advantages and disadvantages. It also indicates improved methods for direct comparison of whiteners of different types.

Before discussing methods of evaluating fluorescent whitening agents, let us review some of what is known about how these materials work. It might be well to start by considering the factors involved in the term "whiteness."

Figure 1 shows reflectance curves of a piece of 80 x 80 bleached cotton cloth four years old and of magnesium oxide, the latter being commonly accepted as a standard for whiteness. The curve for the bleached cotton differs from that for the magnesium oxide in two respects: it is lower, and it slopes upward from left to right. The lower reflectance means that the cotton is darker than magnesium oxide; the slope means that the cotton is yellower than magnesium oxide. Any method of improving the whiteness of the cotton should ideally both raise the curve and lessen the slope. The methods to be discussed are intended for use with bleached cloth, and are not substitutes for chemical bleaching.

One common method of whitening makes use of a blue dye or pigment; this is what the housewife does when she adds bluing to her wash. Figure 2 shows reflectance

Figure 1. Reflectance curves of magnesium oxide and old bleached cotton cloth

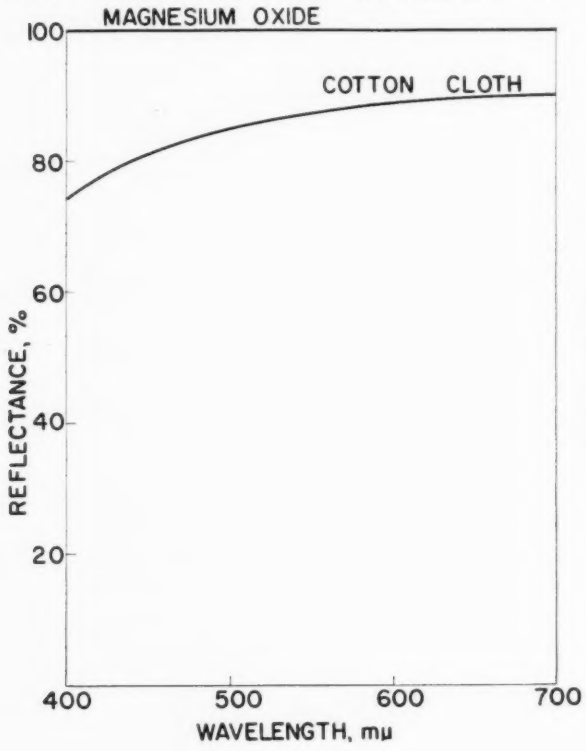
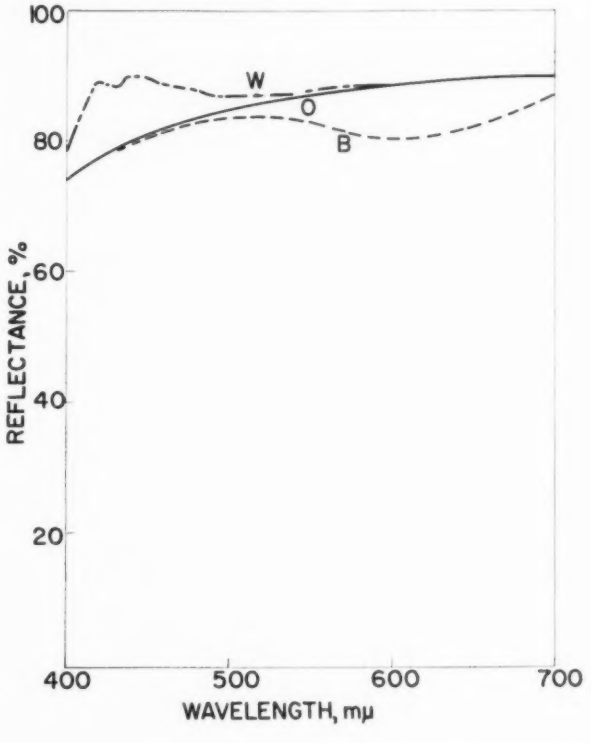


Figure 2. Reflectance curves of old bleached cotton cloth, before and after treatment with laundry blue and fluorescent whitener. O — Original cotton cloth; B — Same cloth treated with laundry blue; W — Same cloth treated with fluorescent whitening agent (apparent reflectance curve)



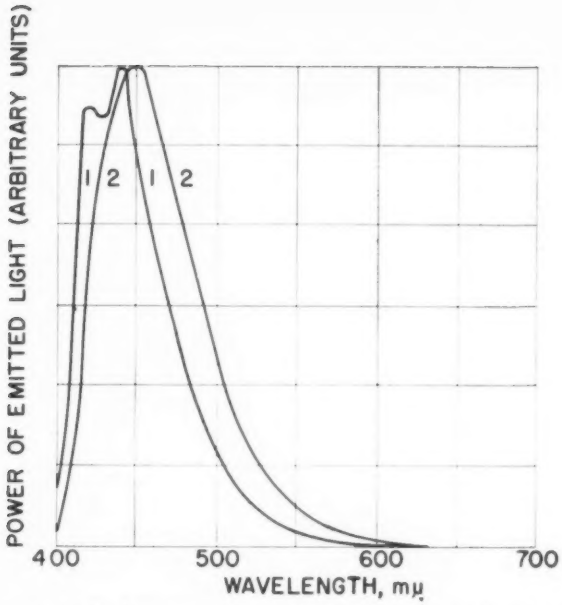


Figure 3. Distribution of energy in emitted light from dyeings of red-shade and green shade whiteners. 1. Red-shade whitener; 2. Green-shade whitener.

curves of the same piece of cloth as that used for Figure 1, both before and after treatment with laundry blue. Curve O represents the original cloth, and is identical with the lower curve in Figure 1. Curve B represents the same cloth treated with laundry blue. It can be seen that such treatment lessens the overall slope of the curve, but also lowers the curve. Thus, bluing decreases the yellowness, but also makes the cloth darker. In effect, it changes the color of the fabric to a light gray.

Fluorescent Whitening

ANOTHER method of improving whiteness is by use of a fluorescent whitening agent. These agents are dyes which absorb ultraviolet radiant energy (always present in daylight) and re-emit this in the form of blue light. Figure 3 shows how this emitted light is distributed through the spectrum in the case of a red-shade whitener, Curve 1, and a green-shade whitener, Curve 2. The highest energy of emission occurs at a wavelength close to 440 millimicrons. There is relatively little emitted light above 500 millimicrons, which is about where the blue region ends. Note that the curve for the green-shade whitener is displaced to the right of that for the red-shade whitener. This shows that the former type gives off relatively more energy at the higher wavelengths, which accounts for its greener shade on cloth.

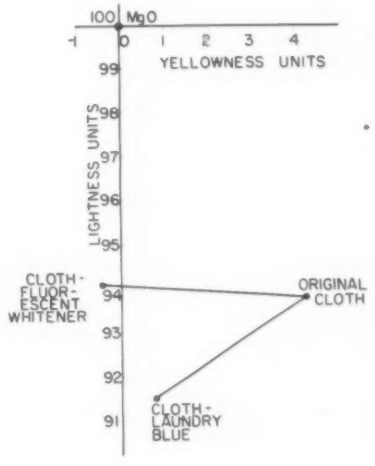
Since the emitted light from the whitener is added to the reflected light from the cloth, we can superimpose the emission curve of the whitener, shown in Figure 3, onto the reflectance curve of the cotton, shown in Figure 1, in order to find out what happens when a cotton cloth is treated with whitener. The method of doing this is described in the Appendix. Curve W in Figure 2 shows an "apparent reflectance curve," which illustrates the effect of dyeing the cloth with the red-shade whitener whose emission curve is shown in Figure 3. Note that the curve for the cotton treated with whitener not only has a lesser slope than the curve for the original cotton cloth, but is also higher than the latter. This shows that the fluorescent whitener not only takes away the yellow cast of the original cloth but also increases its lightness.

To make these effects more concrete, the curves shown in Figure 2 were calculated over to yellowness and lightness values (as explained in the Appendix). Figure 4 shows the colors of the original cloth, the cloth treated with laundry blue, the cloth treated with fluorescent whitener, and magnesium oxide plotted on a diagram with yellowness as one axis and lightness as the other. The units are such that one unit of yellowness change is equal visually to one unit of lightness change. It is seen that use of laundry blue produces almost as much darkening of the cloth as it does decrease in yellowness. On the other hand, the fluorescent whitener lightens the cloth slightly while it decreases its yellowness. This shows graphically the great advantage of fluorescent whiteners over dyes of the laundry blue type.

The diagram also shows that the main effect of fluorescent whiteners is to decrease yellowness (or, what is the same thing, increase blueness). The lightening effect is much less important. Fluorescent whiteners are sometimes called "brighteners." This would appear to be a misnomer, since brightness is associated with lightness. "Anti-yellowers" would be a more descriptive term, although somewhat clumsy. Probably the more general term "whitener" is the best.

Depending on whether a red-shade whitener or a green-shade whitener is used, the treated cloth may appear reddish or greenish in hue. Which hue is preferred is a matter of personal choice. From the point of view of evaluating

Figure 4. Yellowness and lightness values of old cotton cloth, before and after treatment with laundry blue and fluorescent whitening agent.



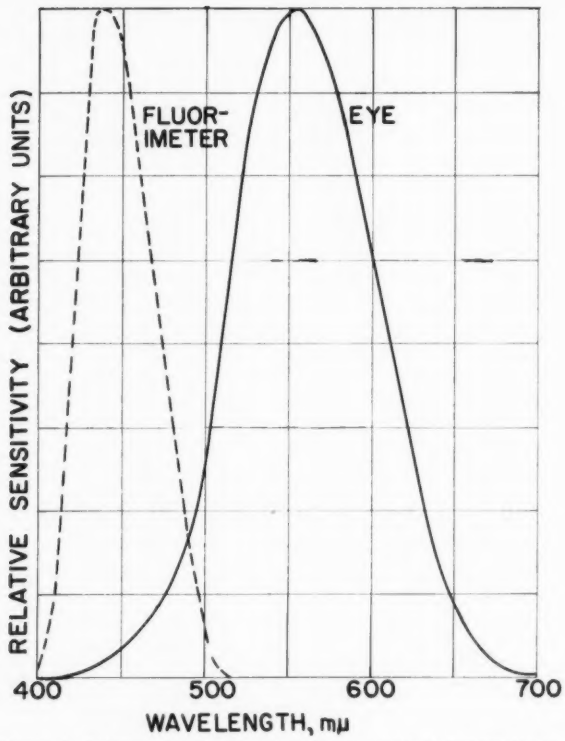


Figure 5. Relative sensitivity of human eye and of fluorimeter to different wavelengths of light

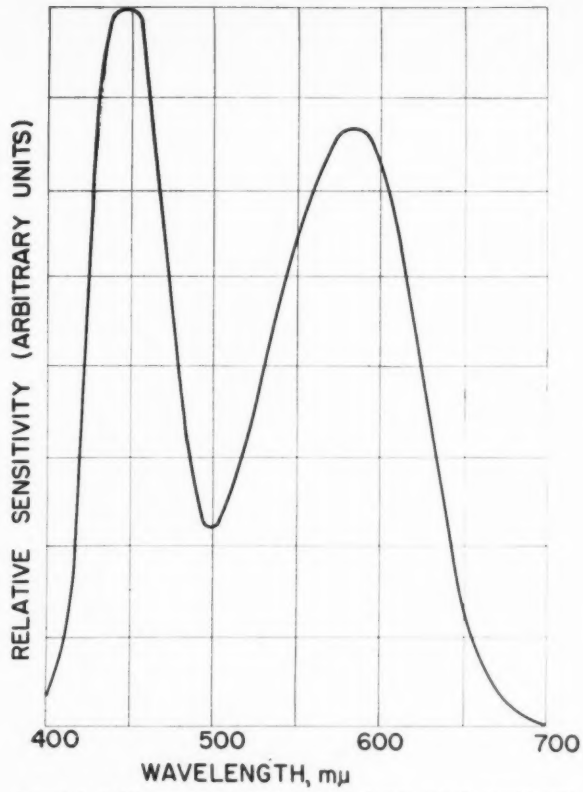


Figure 6. Relative sensitivity of viewing device which would give theoretically correct indication of whitening power

whiteners of different shades for their whitening efficiencies, it is best to disregard the final hue produced. We can do this by only considering the two fundamental effects mentioned above: the bluing effect, and the lightening effect. For this reason, the problem of hue preference will not be further considered in this article.

Measuring Whitening

IT can be shown by theory that both the bluing and the lightening effects of a fluorescent whitener are proportional to the amount of fluorescence emitted by the whitener-treated material. Also, if two dyeings made with different whiteners have the same amount of fluorescence (as defined below), they appear equally white to the eye (1). Therefore, the evaluation of a fluorescent whitener consists in determining the amount of its fluorescence when dyed on cloth. To compare two different fluorescent whiteners, A and B, for their whitening efficiency, one determines the concentration of whitener B which gives the same amount of fluorescence as a fixed concentration of whitener A. The ratio of these two concentrations is then a direct measure of the relative whitening efficiencies of whiteners A and B.

However, we are immediately faced with a fundamental problem: How do we define "amount of fluorescence"? That this is not an easy term to define may best be illustrated by an experiment: A dyeing on cotton of the red-shade whitener whose emission curve is shown in Figure 3 was made at a concentration of 0.0060 per cent on the weight of the cloth. Dyeings on cotton of the green-shade whitener whose curve is shown in Figure 3 were made at varying concentrations. These dyeings were compared visually under ultraviolet illumination to the dyeing of the red-shade whitener, and judged for amount of fluorescence. It was found that a 0.0066 per cent dyeing of the green-shade whitener matched the 0.0060 per cent dyeing of the red-shade whitener for amount of fluorescence. The same dyeings were then read on a fluorimeter with the same light source as was used in the visual examination. It was found that a 0.0142 per cent dyeing of the green-shade whitener matched the 0.0060 per cent dyeing of the red-shade whitener for amount of fluorescence. Thus, although both methods evaluated amount of fluorescence, different results were obtained depending on how the sample was examined.

This discrepancy is easy to explain. Neither the human eye nor the fluorimeter is equally sensitive to all wavelengths of light. Figure 5 shows the relative sensitivity of the human eye to stimulation by different wavelengths of light. A similar curve is also shown for the fluorimeter used in the experiment described above. Note

that the human eye has no sensitivity to ultraviolet radiation and very little sensitivity to violet (400-450 millimicrons). The sensitivity of the eye goes up into the blue (450-500 millimicrons) and reaches its maximum in the green (500-570 millimicrons). On the other hand, the fluorimeter is very sensitive in the low-wavelength regions of violet and blue.

Now consider the emission curves of Figure 3. The green-shade whitener emits more light at higher wavelengths than does the red-shade whitener. Since the eye is more sensitive to these higher wavelengths, the green-shade whitener is favored in the visual examination. On the other hand, since the fluorimeter is more sensitive to the lower wavelengths, the red-shade whitener is favored in the fluorimeter. Therefore, much less green-shade whitener has to be applied to the cloth to match the 0.0060 per cent dyeing of the red-shade whitener when the comparison is made visually than when the comparison is made by fluorimeter.

Now it may seem that the visual response is the only one with which we are concerned. After all, the housewife looks at her sheets and pillow cases by eye; she does not measure them in a fluorimeter. However, the situation is not quite so simple. The visual response curve shown in Figure 5 shows the relative effect of different wavelengths of light in stimulating the eye. The more the eye is stimulated, the more light it sees. Therefore, this curve can be correctly used to predict the effect of different whiteners in making the cloth *lighter*. But we indicated previously that fluorescent whitening agents have two effects, a lightening effect and a bluing effect, of which the latter is of much greater magnitude and thus much more important. The visual sensitivity curve tells nothing about the sensitivity of the eye to color changes, and therefore does not indicate what the bluing effect would be under daylight examination.

As we have seen, both the eye and the fluorimeter are not equally sensitive to all wavelengths of light. Suppose we had a viewing device which would be equally sensitive to all wavelengths. Such a device would measure all the fluorescence from a dyeing of whitener without favoring one wavelength over another, and would therefore give a reading for amount of fluorescence which would be more nearly correct from the physicist's point of view. Would this kind of fluorescence measurement be a good measure of whitening power? It would not, and this can easily be illustrated by imagining a hypothetical "fluorescent whitener" whose emission curve would be displaced 100 millimicrons to the left of those shown in Figure 3. Such a dye would emit in the ultraviolet. But the human eye cannot see ultraviolet radiation. Therefore, such a dye would be no good as a whitener, although it would register a high reading on our viewing device which is not selective in wavelength.

Therefore, if we are to determine whitening power by reading amount of fluorescence, we need some sort of viewing device which would weight the different wavelengths of fluorescence in such a way as to favor those wavelengths which contribute most to the whitening effect of the dye. Since the whitening effect is visual, we need a response curve which is tied up with the visual mechanism; however, we cannot use a curve which is restricted to lightness effect alone, such as that shown in Figure 5.

Theoretical considerations (1) show that the response curve desired is the one shown in Figure 6. If dyeings of fluorescent whiteners are irradiated with ultraviolet and examined by some device having the relative sensitivity to light at different wavelengths shown in this curve, an accurate measure of the whitening effect in daylight (comprising both bluing effect and lightening effect) is obtained, regardless of the type of whitener. This curve is the sum of the tristimulus functions, $\bar{x} + \bar{y} + \bar{z}$. We can therefore define "amount of fluorescence," or, more accurately, "effective fluorescence," as the measured fluorescence under ultraviolet illumination, this fluorescence to be sensed by a device with the response curve shown. Thus defined, "effective fluorescence" is a direct measure of daylight whitening power for any fluorescent whitener.

It should, perhaps, be emphasized that this strict definition becomes necessary only when different types of whiteners are being compared. For evaluations with only one particular whitener, such as might be undertaken in determining the effect of concentration on fluorescence, any viewing device would be adequate. The ordinary type of fluorimeter is particularly useful in such study. It is, however, well known that a fluorimeter cannot be used for comparing two different whiteners; this could be done if the fluorimeter had the response curve shown in Figure 6, and if certain other modifications were made. This will be described in greater detail later in the article.

Methods of Evaluating

WITH this much of a background, let us now examine critically some of the methods in use for evaluating fluorescent whitening agents for their whitening power. Each method has certain advantages and disadvantages, which we will be able to understand in the light of the previous discussion.

It should be mentioned at the outset that most of the methods commonly used to measure whiteness of non-fluorescent whites cannot be used with fluorescent whiteners. Such instruments as the G. E. Brightness Meter, the General Electric Recording Spectrophotometer, and most of the three-filter colorimeters on the market give completely misleading results. Entirely new methods are required with these substances, because of their fluorescent properties.

Visual Examination in Daylight: This is the most accurate

method of evaluation, since it gives directly the results required. The housewife judges a fluorescent whitener by examining her wash in daylight as it is hanging on the line. Although she does not make a detailed analysis of her visual sensations, in effect she integrates the bluing effect and the lightening effect to obtain an overall estimate of whiteness.

However, this method has two major disadvantages. The first is that although this is the most accurate method, it is certainly the least precise. Accuracy is a measure of how closely the results approach the correct value, and the method is accurate because it gives directly the correct value. But precision is a measure of how reproducible duplicate determinations are, and the method fails in this respect because slight differences are difficult to see. For example, in dyeings with the same whitener, the eye can barely distinguish a 10 percent change in strength by daylight examination. This would make the method unsuited to control of dye quality or studies of build-up, lightfastness and the like. Daylight evaluation becomes even more uncertain when whiteners of different shade are compared against each other, since the shade difference confuses the estimation of whiteness.

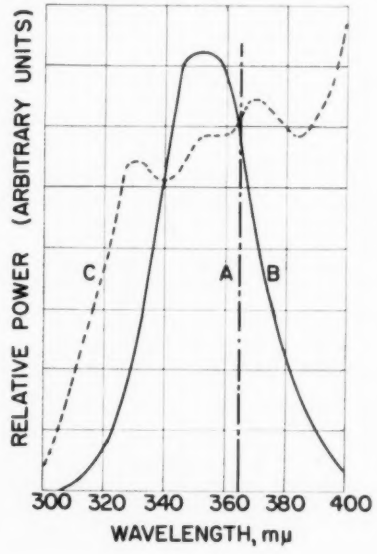
The second disadvantage relates to a standard light source which duplicates daylight in spectral quality. Daylight varies in spectral quality not only from day to day but from minute to minute. If any reproducible work is to be done, it is necessary to specify an artificial light source which would approximate daylight, would be unvarying in quality, and could be exactly duplicated from laboratory to laboratory. The Inter-Society Color Council has set up Subcommittee for Problem 18, Colorimetry of Fluorescent Materials, which is actively working on this problem. It is hoped that a standard light source will be available in the near future.

Visual Examination under Ultraviolet Illumination: The remaining methods to be considered all evaluate amount of fluorescence. The simplest method of doing this is to look at the dyeings under ultraviolet radiation, and judge the fluorescence visually.

Because of its simplicity, this is an excellent method, but unfortunately, its use is limited to evaluation of dyeings made with the same fluorescent whitener, for reasons to be discussed in the next paragraph. However, this method can be used in examining dyeings made with different whiteners if one is only interested in shade differences, for example, to judge whether a given sample is redder or greener in hue than a standard sample. For checking dyeings with the same whitener for amount of fluorescence, this method is more precise than evaluation in daylight; a strength difference of 5 percent may readily be seen. Therefore, the method is suitable for studies on build up, light fastness, variation of fluorescence with concentration of whitener, and similar problems.

The major disadvantage of this method is that it cannot be used for comparing dyeings made with different whiteners for their amounts of fluorescence, except where very rough evaluations are needed. There are two reasons for this. First, as was discussed previously, the response of the eye does not have the correct characteristics for judging the whitening effect in daylight. This was explained in connection with the discussion of Figures 3, 5, and 6. Second, the ultraviolet sources commonly in use for examining whitener dyeings do not agree in spectral energy distribution with the ultraviolet component of daylight. That this may produce an error can be illustrated by the following experiment:

Figure 7. Distribution of energy from different light sources. A — AH5 mercury lamp with Corning No. 5874 filter; B — T12 black light lamp with Integral filter; C — daylight (Middleton)



A 0.0060 percent dyeing on the weight of the fabric of a fluorescent whitening agent, designated Whitener 3, was made on cotton. A series of dyeings at varying concentrations of another fluorescent whitener, designated Whitener 4, was made on cotton. These dyeings were then examined visually under ultraviolet illumination from two different light sources. One was an AH-5 mercury lamp with Corning No. 5874 filter to cut out the visual light. Almost all of the ultraviolet energy from this light source is concentrated at the single wavelength of 365 millimicrons. The other was a 40-watt T12 black light lamp with integral filter. This lamp gives off radiation over a range of wavelengths in the ultraviolet. The spectral energy distributions from both lamps are shown in Figure 7, where A refers to the AH-5 lamp and B to the T12 lamp. Comparisons were made under each lamp to determine which dyeing of Whitener 4 most closely matched in amount of fluorescence the 0.0060 percent dyeing of Whitener 3. Under the AH-5 lamp it was found to be the 0.0090 percent dyeing of Whitener 4 but under the T12 lamp it was the 0.0050 percent dyeing of Whitener 4. Thus, Whitener 4 showed greater fluorescence under the T12 lamp than it did under the AH-5 lamp, as compared with Whitener 3.

These results are easily explained. Figure 8 shows reflectance

(*Turn to Page* 93)

What the Small Soaper Expects of His Supplier

By Daniel H. Terry
Vice-President
Dir., research and development
for
The Bon Ami Company
New York, New York

A GREAT many changes have taken place in the chemical industry and also in its research, development and marketing habits in the past 20 years. The center of our chemical industry has leaned more and more towards the laboratory. With this shift, we have somehow begun to neglect a very important phase of any operation—the consumer.

In the past, we have been inclined to think of a new scientific development as a guarantee of increased sales. We have also had a tendency to forget that the new product after it has passed all the tests of laboratory and production still faces the hardest test of all. Is the product one that the consumer needs now, wants, and can use?

Most applied research programs contain two important objectives: 1. The impovement of existing products and the development of new ones. 2. The uncovering of new knowledge and techniques that can improve the quality, production, and distribution of the improved and new products.

Most of us think of accomplishing these objectives in laboratories. To a great degree that is where the objectives are reached. Although we realize the value of the normal techniques in guiding research policies, most of us also know of cases where "hunch" played a part.

Just how does the research director know there is desire, active or latent, on the part of the public or industrial organization to buy a product. The problem of the consumer, what he needs, wants, sees, and thinks must be reflected back to the laboratory. This is a job for market research or commercial development.

The subject of our discussion is, "Developing Markets for Detergent Materials in the Soap and Specialties Industry." Furthermore, we have been asked to present our views on the problems involved in marketing raw materials in soap and chemical specialties industry. However, before going any further into the subject, since I am concerned with the development of new products and the improving of existing products in the consumer market, we feel that it would be worthwhile to indicate generally the differences between the consumer and industrial markets.

Industrial marketing refers to the sale of products for use by industry, as opposed to direct sales to consumer, rather than directly to the public. The major difference between consumer and industrial marketing is obviously in the so called "universe." For companies marketing products to the consumer, it is necessary to consider every American (and a lot of foreigners, too) as potential buyers.

Industrial marketing is different. The universe, the number of present and potential customers, is considerably smaller. Hence, it is usually possible to contact personally a large majority of the total universe.

In the development of products for the industrial market it is necessary, first, to find which of the consumers needs shows the most promise from the research standpoint. Next, he must be supplied with information, data, and, if necessary, some laboratory assistance in an effort to find the best utilization of the material in his product.

Since I represent a small consumer company, I would like to present my views on the problems involved in marketing raw materials to the small consumer companies in the soap and specialty industry.

First, let us consider the research staff of a small consumer company. In general, the research

Paper presented at the meeting of the Chemical Specialties Manufacturers Association on May 22, 1957, at the Drake Hotel, Chicago.

staff of a small consumer company is limited. It normally operates on a small budget and, as a result, it is limited in its capabilities to do basic research work. In view of this, most of the research staffs of smaller companies concentrate their efforts on compounding, formulating, testing, and evaluating new and old products and carrying out application work on these new products. Most of the materials and ingredients used in its development work are supplied by bulk manufacturers.

As a result, the small consumer company is more dependent upon information, data, and the assistance of the bulk supplier than the larger companies. It should be further pointed out that a small consumer company is limited to the introduction of one and possibly two new products at any one time. A small company cannot afford to support and promote too many products simultaneously. In addition, a small company cannot wait two to three years to show a profit from the introduction and merchandising of new products. A larger company can afford to take a longer time to show a profit on its new products because the costs can be spread over other profitable items already on the market.

On the other hand, one of the big advantages of the small companies is that they can move faster by cutting red tape and obtain decisions quickly. It should be remembered that a small company does not necessarily remain small, while large firms grow bigger.

Introductions Cost Money

WE should also like to mention that the cost of introducing new consumer products is high. A small company by introducing one product at a time still has to go through market research, consumer test, and test marketing to obtain all the necessary information on its product before introducing it nationally. All of these steps cost money. In addition, the introduction of any new product requires promotion and advertising. The small companies cannot afford many flops, if any. Potential growth in a small consumer company depends upon the profit and success received from the introduction of a product this year, last year, two years ago or five years ago.

Dr. Terry, at lectern, as he presented his paper during recent CSMA midyear meeting in Chicago. Other panelists: Carl Pacifico, American Alcolac, head in hand, moderator; John A. Quinn, Theobald Industries; Robert F. Way, Colgate-Palmolive Co., and John Bahlburg, Wyandotte Chemicals.

We would like to re-emphasize the fact that the small consumer companies are dependent on suppliers for basic information on their products. Also, application data and suggested formulations are of considerable assistance to the small consumer laboratory in their development work.

Most of the bulk suppliers have data sheets on their products offered to the consumers. These data sheets should cover the physical constants and properties of the product. Also, toxicity, patent status and suggested applications for the product should be included. If possible, suggested formulations are most helpful to the small consumer development laboratory. In addition, information on availability, pricing (F.O.B. or delivered), size and type of containers, shipping points and hazards in handling should be incorporated in the one data sheet or covered by a separate form.

The relationship between the supplier and the consumer is very important. The supplier should become acquainted wherever possible with the types of products marketed by the consumer, the basic marketing intentions of the consumer, the present and future planning on products by the consumer, the importance of each problem to the consumer, the priority and status of the problem or problems involving the supplier's compound or compounds.

This information is essential to the supplier. It is helpful to the supplier's company in deciding how much application and laboratory work, if any, should be done for the consumer and whether additional plant equipment and expansion are required to meet the consumer's requirements.

In my opinion, one of the most important problems in developing markets in this field is the relationship between the supplier and the user. A method should be devised to exchange technical information which will enable each group to be of the utmost assistance to the other.

In small companies, resources are frequently limited. However, many small firms have chalked up notable sales gains as a result of research and development. It seems safe to say that in the next five to ten years many small concerns will become large concerns, because enlightened managements will recognize the long term advantages in growth potential inherent in a sound research and development effort. This can only be accomplished in a small consumer company through coordinated efforts of the supplier and the consumer.

References

"What Products Does The Consumer Need Now?" by F. S. Swackhamer; *"Chemical Processing"*, page 11, April, 1957.

New Device and Methods Improves

Spray Pattern Measurement

By Morris J. Root
G. Barr & Co.

A SIMPLE and speedy method for the qualitative evaluation of aerosol spray patterns is based on the impingement of the spray on a piece of paper previously treated with a dye-talc mixture. Equipment required for the new test method can be set up at a cost of about $150.00.

A 5 per cent mixture of the dye in talc is brushed onto a 60-pound Vellum paper stock. A small, but known, burst of spray is allowed to impinge upon the treated paper. Wherever the particles strike the paper the dye goes into solution and is absorbed. The size of the dye spots are in direct relation to the size of the liquid particles when they come into contact with the paper. The dye used must be soluble in the spray particles. In the case of alcoholic sprays such as hair lacquers, a water-soluble dye such as DuPont crystal violet must be used; in the case of oil soluble sprays such as insecticides, an oil soluble dye for example, DuPont oil red powder, must be used.

The apparatus is made up from the following:

1. General Electric A-C Motor Type SKH, 48, 1/6 HP, 1725 RPM, 60 cycle, 115 volts, or equivalent.
2. Variable speed "Zero Max" torque converter, Model 142X, Revco Inc., Minneapolis, Minnesota.
3. One-inch diameter by 4" long connecting rod from torque converter to disc.
4. Rotating Disc made from 1/16" thickness aluminum or stainless steel, 5¾" radius; cut-out radial sector, 14 cm. at circumference; 15-cm. sliding shutter.
5. Mounting Board.
6. Slot on disc to accept 5" x 5" piece of paper.

In order to know the exact amount of material which is sprayed from the container, it is necessary to know the rate of rotation of the disc, the dimensions of the cut-out sector, and the delivery rate of the valve. The sector must be pie shaped, i.e., the edges must follow the radii of the disc. Using the equation below, it is then possible to calculate exactly how many grams are sprayed through the disc.

$$\frac{SD}{2\pi rR} = \text{Grams}$$

S—Slit width at circumference in cm.

D—Delivery rate of valve in grams per second.

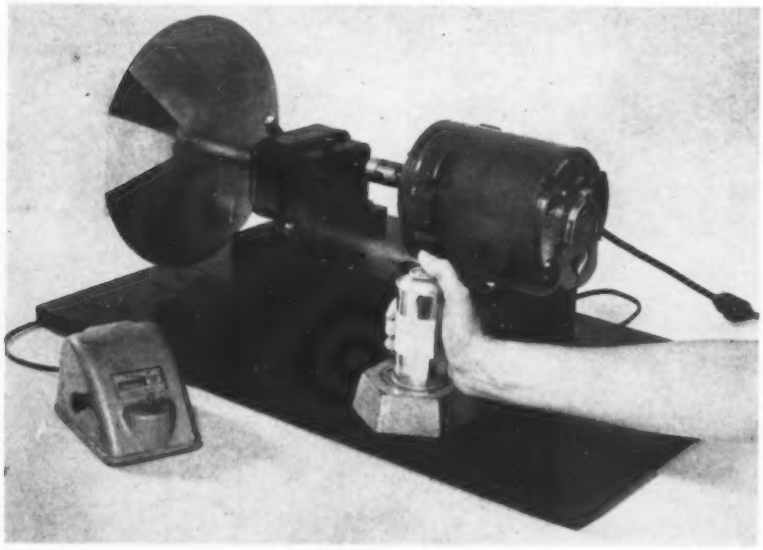
R—Rate of revolution of disc in revolutions per second.

r—radius of disc in centimeters (14.5 cm.)

The disc must revolve slowly enough so that it is possible to depress and release the aerosol valve before the slot in the disc has made a second revolution in front of the spray. A small slit width and high rate of revolution permit only a small amount of spray to pass, while a large slit width and slow rate of revolution permit a large amount of spray to pass.

Patterns made from aerosols containing only fast drying solvents can be kept indefinitely and serve as a permanent record, whereas patterns made from aerosols containing oils or solvents which dry slowly change with time and must be photographed for a permanent record. The slow or non-drying oil with dissolved dye gradually spreads in the paper, thereby distorting the pattern obtained.

This spray pattern technique is particularly useful for comparing spray characteristics obtained with different valves, actuators and formulations. The method is rapid, easily done, and can be visually evaluated.



★

Johnson Names Croft

Frank D. Croft has been appointed managing director and vice-president of S. C. Johnson & Son, Ltd., Brantford, Canada, it was announced last month. The Brantford firm is operated as a subsidiary of S. C. Johnson & Son, Inc., Racine, Wis.

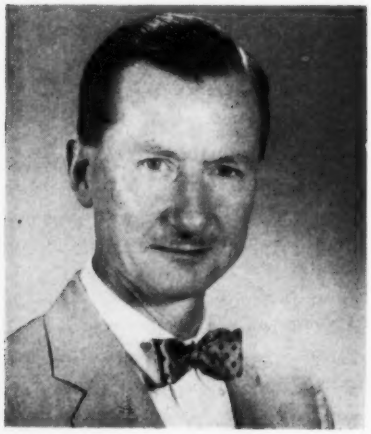
New Aromatic Supplier...

Availability of new aromatic chemicals foreseen as Hoffmann-La Roche enters perfume material field

New Hoffmann-La Roche plant for complete synthesis of vitamin A and production of aromatics consists of four distinct units.

MAKING "vitamins by the ton" has led Hoffmann-La Roche, Inc., of Nutley, N. J., to become a manufacturer and commercial supplier of synthetic aromatics. Effective July 1, Roche's aromatic division offers to soap and detergent makers and other industrial consumers of basic perfume materials: linalool, linalyl acetate, nerolidol, and a completely new aromatic: geranyl acetone. This entire development stemmed from a project intended to free vitamin A and E production from dependence on lemongrass oil as a starting material. This required evolving a complete synthesis.

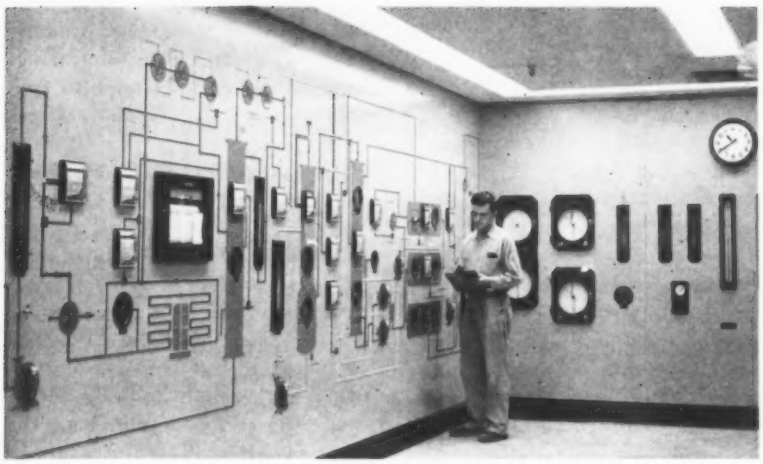
Philip C. Burnham
Sales manager, aromatics division



The new Roche venture is supervised by Philip C. Burnham, division sales manager, and Burton T. Bush, Jr., assistant sales manager. The company will sell directly to soap and detergent manufacturers and to distributors of aromatic chemicals. A new house organ and advertisements in the trade press will keep consumers informed of Roche aromatics, current and in the making.

Several years ago Roche developed a partial synthesis for vitamin A and E and the provitamin beta-carotene. This partial synthesis, originated by Dr. Isler and his team of research workers in Basle, started with citral isolated from lemongrass oil. However, uncertain supplies and fluctuating prices of lemongrass prompted Hoffmann-La Roche to start a research project to take the vitamin A and E synthesis right back to basic raw materials. Work was started about five

Burton T. Bush, Jr.
Assistant sales manager



Flow panel for diketene manufacture shows the high degree of automation in plant.

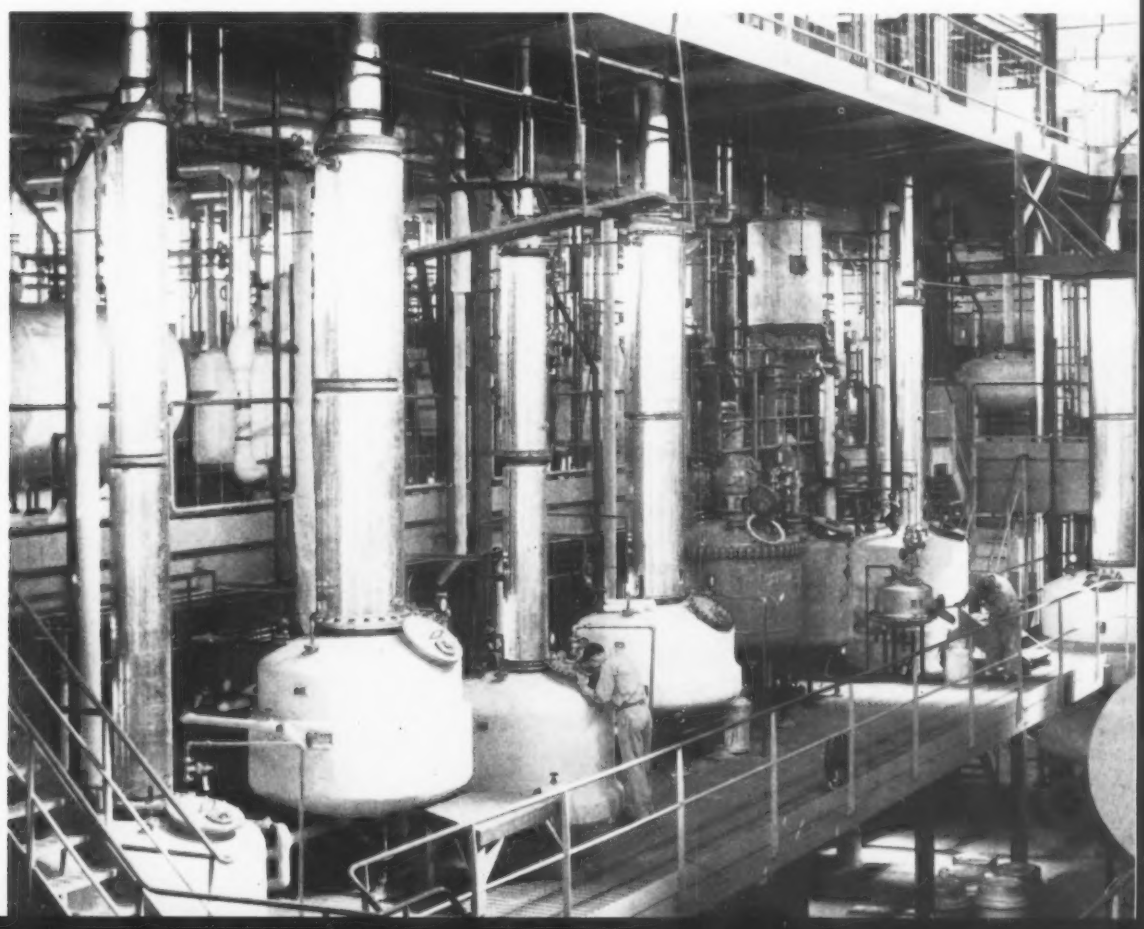
years ago when synthetic vitamin A production first got fully under way. The process was successfully developed and adapted to production scale in Nutley by a group of chemists, chemical engineers and engineers headed by Dr. Alfred Ofner, director of technical development. Direct result of this major scientific and technological achievement is the new Roche plant which makes pseudo-ionone using acetone and acetylene as starting materials.

Technically the synthesis proceeds as follows: acetone is reacted with sodium acetylide in liquid ammonia to give methylbutynol. Using Lindlar catalyst this compound is partially hydrogenated to methylbutenol or dimethylvinyl carbinol. Condensation with diketene yields the acetoacetic ester of methylbutenol, which, when heated to 140-160° C., loses carbon dioxide and rearranges to methyl heptenone in high yield.

Methylheptenone is reacted with sodium acetylide in liquid ammonia whereby a 10 carbon acetylenic alcohol is obtained, known as dehydrolinalool. Undergoing ketonization by treatment with diketene followed by pyrolyis at 170°-190° C., dehydrolinalool gives pseudo-ionone, the yield being about 35 per cent, based upon acetone and acetylene. Branching off before the second reaction with diketene, on the way to vitamin E the process yields linalool by partial hydrogenation of dehydrolinalool. The latter can be acetylated and partially reduced to linalyl acetate. At a later stage nerolidol is formed as an intermediate for vitamin E. Beta-ionone occurs in the regular synthesis as an intermediate step in the formation of vitamin A.

In addition to several im-

Part of the still area in the general process building of the Hoffmann-La Roche aromatics plant in Roche Park, Nutley, N. J. Linalool linalyl acetate, nerolidol, and geranyl acetone are currently being made here, with a number of new aromatics to come.



New Aromatic Supplier...

portant aromatic substances produced as intermediates, the process yields a number of intermediates which can be readily converted to linalyl acetate, nerol, alpha-ionone, and alpha-irone. Moreover, the synthesis permits a number of completely new substances to be made, adding fresh possibilities of novel fragrance compositions.

Acetylene is made from carbide and diketene by the pyrolysis of acetone followed by dimerization. The by-product methane is used as a fuel. Diketene is made by a continuous process, all other steps are batch operations permitting quick change from one end product to another.

Theoretically, 290 parts by weight of acetone plus 52 parts of acetylene and two parts by weight of hydrogen can yield 192 parts of pseudo-ionone and 88 parts of carbon dioxide and 64 parts of methane. In making linalool 174 parts of acetone, 52 parts of acetylene and four parts of hydrogen can theoretically produce 154 parts of linalool, 44 parts of carbon dioxide and 32 parts of methane.

The task of transferring the laboratory process to full scale presented major and unusual problems. The multimillion dollar plant recently completed by Hoffmann-La Roche, consists of four buildings, housing the acetylene generators; continuous diketene production, for which Roche researchers developed their own process; ethinylation; and general process.

Safety engineering has received special attention because of the large quantities of acetylene and diketene used. Refrigeration on a very large scale is required in conjunction with the use of liquid ammonia.

Flexibility, an outstanding feature of the original synthesis has been preserved in the plant scale process. Result is economic production of a wide range of products and the promise of a whole crop of new aromatics, some of them hitherto unknown.

★

Ultrasonic Scrubbing

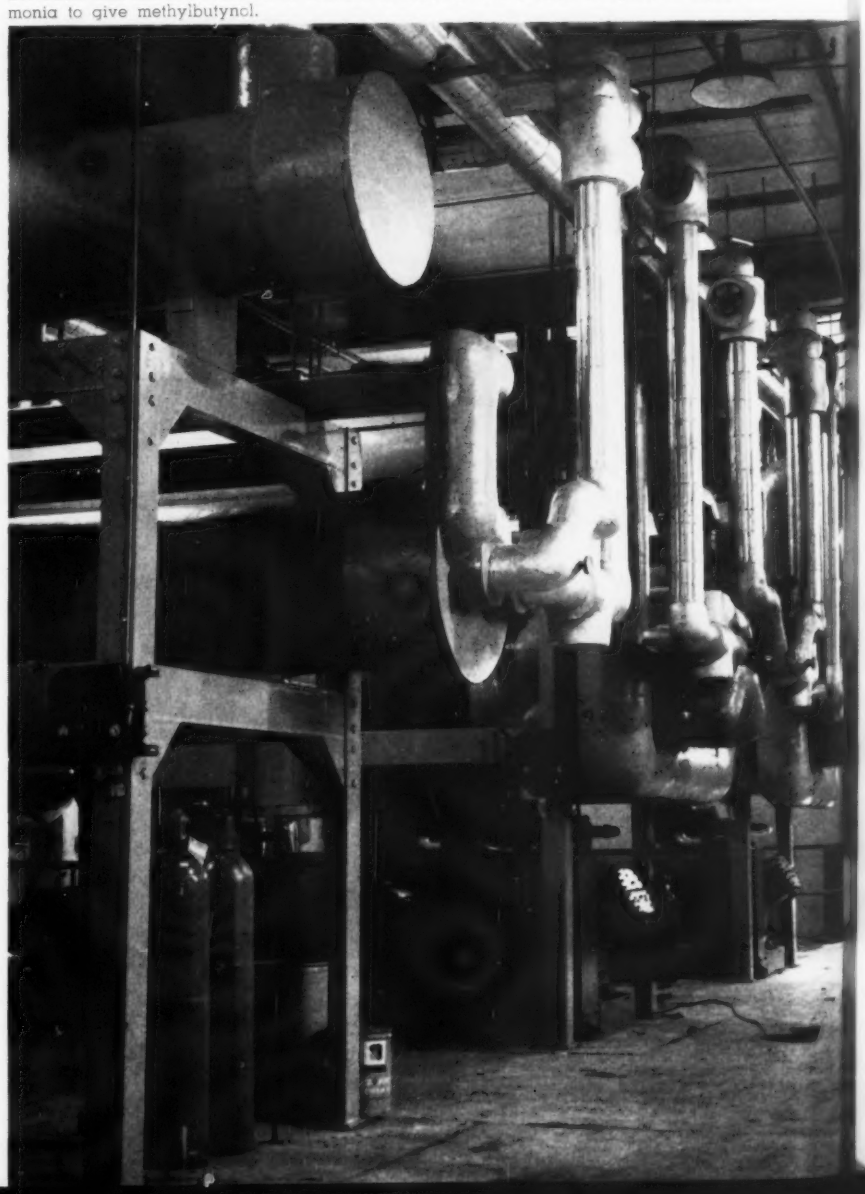
Agitation or mechanical force has long been known to benefit any cleaning operation. Ultrasonic sound, a new method of agitation, is featured in an article entitled "Ultrasonic Cleaning, Scrubbing with Silent Sound," included in a recent issue of *Oakite News Service*, published by Oakite Products, Inc., New York. Selection of the right detergent for the cleaning operation in hand is of the utmost importance. Ultrasonic helps to loosen the soil and brings fresh detergent solution into contact with soiled surfaces.

★

Hexylene Glycol in Polish

Hexylene glycol is one of the essential ingredients in the formula of "Glass Gloss" liquid cleaner, developed by Bon Ami Co., according to a short article which appeared in the July issue of *Chemical Progress*, house organ of Union Carbide Chemicals Co., New York. First introduced on the West Coast in 1949, the wax like cleaner is now sold in a number of major market areas. The product is designed as a cleaner and polish for all metal, glass, and ceramic surfaces.

Huge refrigeration plant shown here is required in handling large quantities of liquid ammonia. First step in the completely synthetic production of vitamin A as evolved by Dr. Ofner and his team consists of reaction of acetone with sodium acetylide in liquid ammonia to give methylbutynol.



Poor color in this sample of sodium toluene sulfonate resulted from use of competitive nitration-grade toluene.

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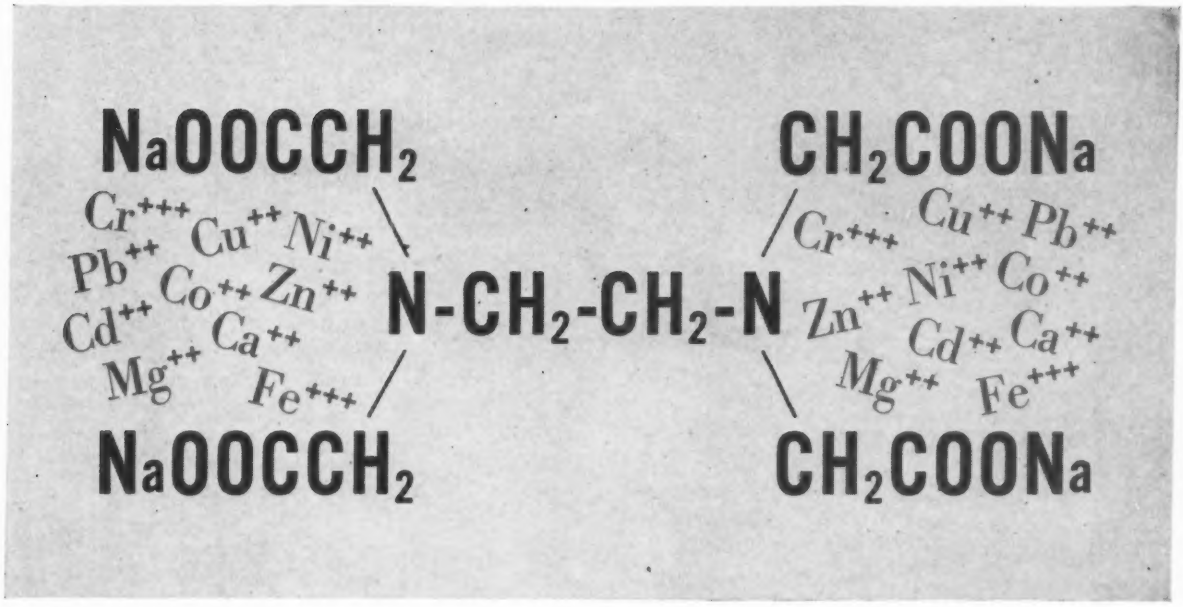

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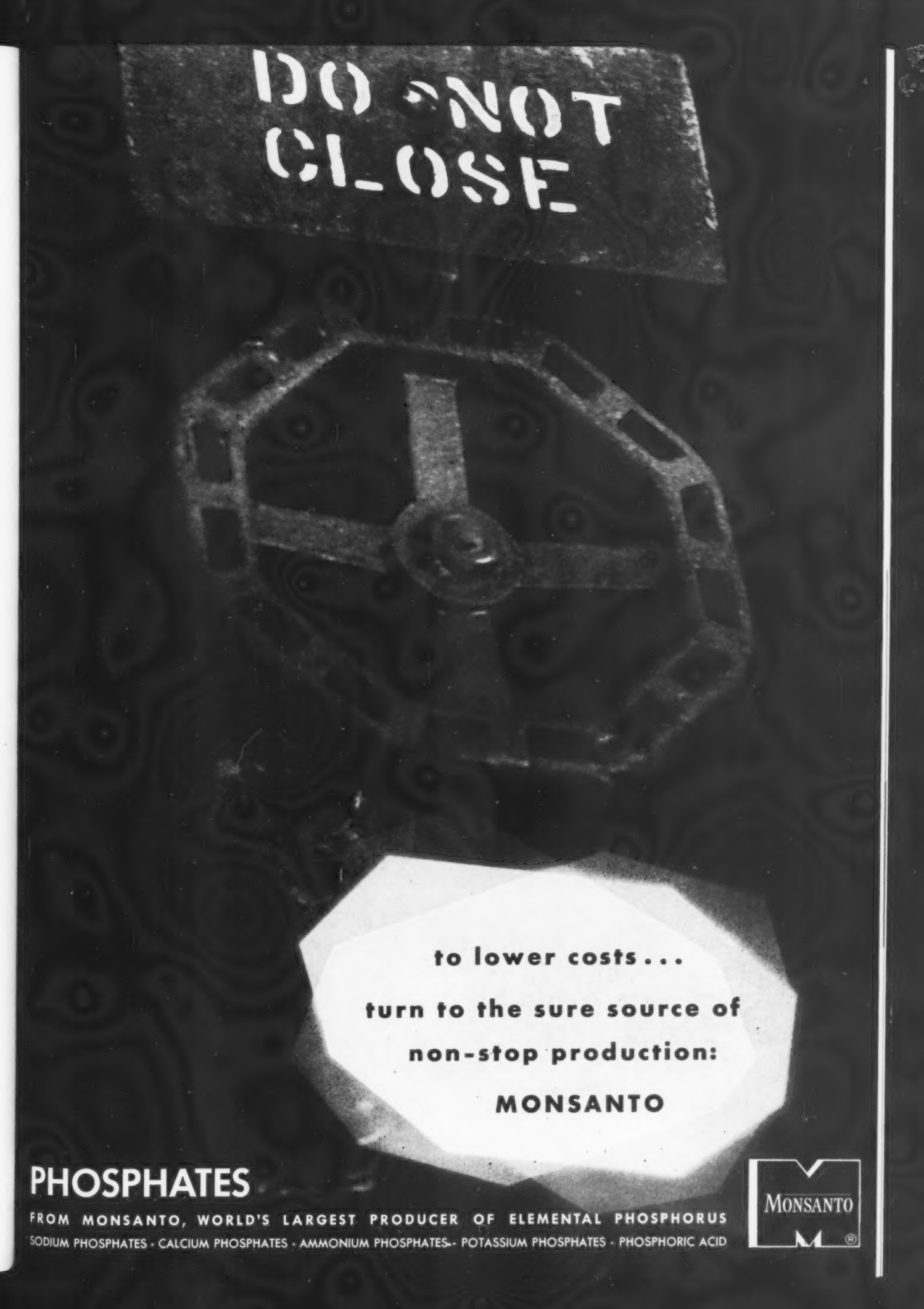

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Chemical Specialties

Labeling cans in short runs at new aerosol loading plant of John Struthers and Co., Montreal. Picture story,"Aerosols North of the Border," showing Struthers' new plant begins on page 68 of this issue.

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H. W. HAMILTON, *Secretary*

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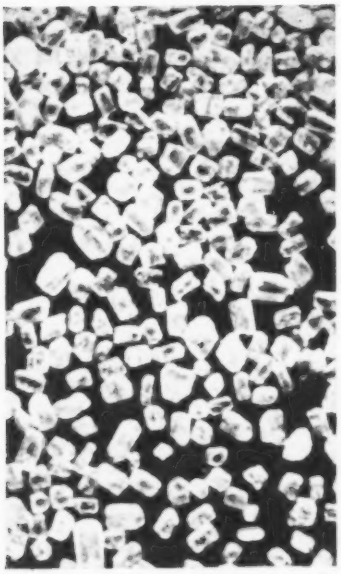

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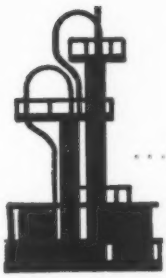

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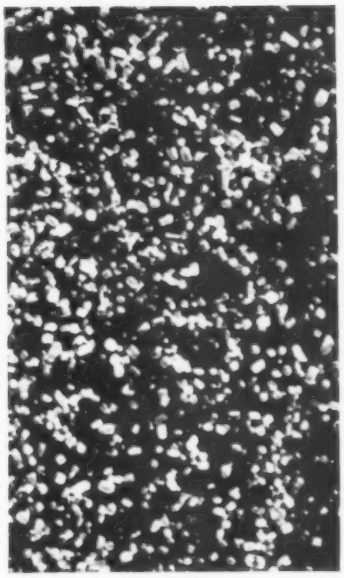

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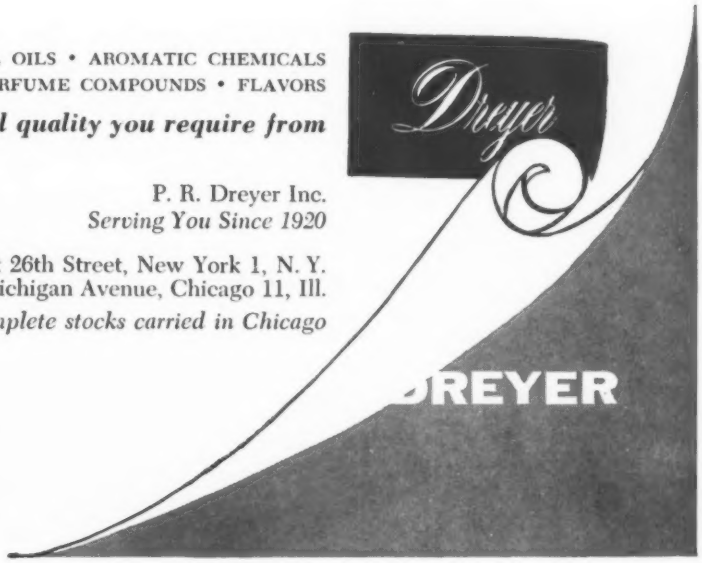

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Current Requirements for Military Insecticides

By Morris Alpert*,
Deputy Head, Chemistry Section,
Material Development Division,
Bureau of Ships,
Department of the Navy

and

Col. Ralph W. Bunn
MSC, U. S. Army,
Executive Secretary,
Armed Forces Pest Control Board

IN reviewing the current pesticide usage of the Army, Navy and Air Force, we will try to list the items we are buying, give an idea of the approximate extent of our usage, and discuss current use patterns.

A current Department of Defense directive states that normally only *standard* pesticides will be used in pest control operations at military installations. A current list of *standard* pesticides is shown in Table I. Study of this list will lead to the following questions: Why is procurement restricted in this way? Why is not such a common item as parathion included? How can a prospective supplier introduce a new item?

A number of factors apply. In military operations, logistic considerations demand the simplification of stocks to the least possible number of versatile items. Next, since some pest control operations involve only partially trained men applying these chemicals in such crowded areas as barracks, mess halls, or ships, safety in use is obviously important. The economic poisons selected must be truly "economic" in the sense that they should affect more insects than men. Next, equal opportunity must be given all possible suppliers. These factors all add up to a formal selection (or *standardization*) of a group of items based on careful test of effectiveness, safety, versatility, storage stability, cost and availability. Where need is quite limited (either in total volume or affected localities), an item will normally not be standardized. However, the professional entomologist overseeing military operations in that area is given authority to permit special local purchase of non-standard items in such instances.

The list of standard items, far from being static, is revised periodically. Any supplier sponsoring a new formulation may approach the appropriate military agencies. Since laboratory facilities are not unlimited, sponsors are urged to furnish their test data comparing the proposed and the standard items. In the event of uncertainty as to which military agency should be approached, the authors of this paper will gladly give their advice.

Current Procurement

WE are proud that in the area of pest control, the three Armed Services have, in very large measure, come to follow the same pathways. Thus, we can say that Table I lists those pesticides being purchased in significant volume for current use by all three services. The information in parenthesis following each item is the number of the applicable purchase specification.

Comments on Table I, Part 1:

Chlordane (2%) or dieldrin (0.5%). Widely used as spot residuals for roach and ant control. Past use of chlordane-DDT formulation has been abandoned. More recently, half-percent dieldrin solutions were placed on an equivalent basis with two percent chlordane solutions.

DDT (10%). Lindane (2%). used for over-all residuals, largely in preventive measures. As an aside, control measures in military installations have been or are now being converted to scheduled preventive operations wherever possible. Considerable savings in time and money have been demonstrated over the older approach of trying to clean up infestations only after

* Paper presented during 43rd midyear meeting, Chemical Specialties Manufacturers Assn., Chicago, May 21, 1957.

they are already obvious and serious.

DDT (20%). This item is used primarily for outdoor area control by fogging or aerial dispersal.

DDT (10%) Lindane (2%). Specially developed formulation for indoor fogging.

Emulsifiable Concentrates. As a group, these concentrates have been troublesome because of container corrosion problems. A partial solution to these problems is offered through the use of lined drums. Certain baked phenolic and, more recently, epoxy linings have been found quite useful. At this time, it might be wise to point out a major difference between civilian and military usage and the resulting differences in packaging used for each. On the civilian market, items are packed mainly for use in the same season or, at most, during the next season. Despite all efforts to the contrary, some of our military items may not be consumed until three to five or even seven years have elapsed. Also, we have to allow for rough handling, possible overseas shipment and unprotected storage. These comments are added here for the benefit of those who, in cooperative spirit certainly, have called attention frequently to what appeared to be overly-stringent packaging requirements.

Malathion has been found quite effective where DDT-resistance is a problem. Either spot applications or bait formulations generally give good control. Close attention is also being given other organic phosphates. However, the comparatively low mammalian toxicity of malathion is a point in its favor.

Part 2

Dusts—1% Lindane is used particularly in the control of body louse infestations, where resistance to DDT dusts has been found. Unfortunately, lindane resistance can probably be expected. Research on alternates is being pushed aggressively.

Table I

CURRENT PROCUREMENT

Part 1 Insecticides

Solutions

- Chlordane, 2% or Dieldrin, 0.5% (O-I-518)
- DDT, 5% (O-I-531)
- DDT, 20% (O-I-509)
- DDT, 10% - Lindane 2% (MIL-I-12262)

Emulsifiable Concentrates

- Chlordane, 46% (MIL-I-16424)
- DDT, 25% (O-I-558)
- Dieldrin, 18% (MIL-I-11425)
- Lindane, 12% (O-I-533)
- Malathion (under development)

Aerosol

- DDT-Allethrin (O-I-508)

Part 2 Insecticides

Water-Dispersible Powders

- DDT, 75% (O-I-568)

Dusts & Dusting Powders

- DDT, 10% (O-I-578)
- Lindane, 1% (MIL-I-11490)

Miscellaneous

- DDT, 100% (C-D-370)

Local Procurement

- Lead Arsenate (O-L-154)
- Lime sulfur (O-I-532)
- Nicotine sulfate (O-I-573)
- Sulfur (O-I-583)
- Summer Oil (O-I-588)
- Winter Oil (O-I-588)

Water dispersible powders

- Dieldrin, 50% (MIL-I-11374)
- Lindane, 50% (O-I-535)

Part 3 Rodenticides and Repellents

Rodenticides

- Calcium cyanide (O-R-501)
- Sodium monofluoracetate, 1080 (O-R-504)
- Zinc Phosphide (O-R-511)

Anticoagulants

- Concentrate (Under development)
- Ready-to-use (O-R-500)

Repellents

- Skin application, M2020 (Type 1 of MIL-R-249B)
- Clothing application, M1960 (MIL-R-12123)

Local procurement. Under this heading are listed several items we use enough so that they were standardized (that is, specifications were developed). Use has not been sufficient to justify stocking throughout the supply system. They are bought locally as the need arises.

Part 3—Rodenticides:

Recent studies of the anticoagulant situation have led us to believe we can simplify the supply problem by limiting our procurement to two items:

1. A water-soluble concentrate suitable for use either in water solutions or in field formulations of baits.

2. A ready-to-use bait.

Repellents

Formula M-2020 is 40% dimethyl phthalate; 30% 2-ethyl hexanediol-1,3; 30% dimethyl carbate. This repellent was developed only a few years ago at the Orlando, Florida, laboratories of the U. S. Department of Agriculture. Most of you are familiar with this unusually productive laboratory and its fine work in military pesticides, particularly in repellents. We would like to call particular attention to a recent major achievement

by that group. They have developed still another new repellent, *N,N*-diethyltoluamide, which reaches a new high in repellent efficiency. Careful tests have shown this to be markedly superior to older items with respect to

1. efficiency against a broad spectrum of insects
2. longer period of useful protection
3. greater sweat and wear resistance.

As a result, very soon, and contingent upon toxicological clearance, military procurement of the new item may be initiated.

At least one commercial formulator is marketing a toluamide repellent for the civilian market. An appropriate label has been accepted for registration by the U. S. Department of Agriculture.

Procurement Levels

NEXT, you will probably be interested in learning how much of these items we use. In Table II there is a tabulation of some twelve to fifteen more or less typical items. We have given figures for the approximate rate of issue for these items by the combined Armed Services, and the unit prices paid for each of them.

Table II

CURRENT PROCUREMENT

Part 4 Issue Rates and Prices

ITEM	Approximate Annual Issue (in thousands)	Average Unit Price
Solutions		
Chlordane, 2% & Chlordane, 2%, DDT, 5%, gal.	215M	$ .72
DDT, 5%, gal.	534M	.58
DDT, 20%, gal.	400M	.79
DDT, 10% - Lindane, 2%, gal.	7.5M	2.89
Space sprays, gal.	97M	.85
Emulsifiable Concentrates		
Chlordane, 46%, gal.	6M	3.35
DDT, 25%, gal.	123M	1.05
Dieldrin, 18%, gal.	4M	3.95
Lindane, 20%, gal.	29M	4.80
Aerosols, dispensers	885M	.48
Water-Dispersible Powders		
DDT, 75% lb.	78M	.34
Dusts and Dusting Powders		
DDT, 10% 2 oz can	135M	.05
lb.	135M	.11
Lindane, 1% 2 oz can	222M	.05
lb.	475M	.12
DDT, 100%	235M	.28
Repellents		
Skin, 2 oz bottles	300M	.17

Most of you are aware that the Navy has been asked to make purchases of pesticides for all three services. For the sake of any who are not aware of the details, if you are interested in supplying pest control chemicals to the military services, all you need do is write to the following address asking that your company be added to the list of those to be tendered invitations to bid: Officer-in-Charge, U. S. Navy Purchasing Office, U. S. Naval Supply Activities, New York, 3rd Avenue and 29th Street, Brooklyn 32, New York.

Certain aspects of the present use patterns stand out: increasing emphasis on aerosols rather than sprays for space treatments and the influence of the appearance of resistance to various insecticides.

Aerosol Use

IN freeing closed spaces of flying insects, we have in the past encouraged the use of liquid space sprays, as opposed to aerosols, principally because it was considered to be a cheaper method of treatment. Two or three years ago, this matter was reopened with interesting results. Using recommended label dosages and current prices, we calculated the cost of treating 1000 cubic feet of space.

	Aerosol	Space Spray
Amount per 1000 cu. ft.	7 sec lgm/sec 7 gm or ¼ oz.	Approx. 2 oz.
Unit Price	48c/12 oz. 4c/oz.	85c/gal. 2/3c/oz.
Cost	1c	1⅓c

In a very simple series of field tests we found that users had a tendency to overdose slightly with aerosols; underdose with space sprays. In summary, if used according to directions, aerosols certainly were no more expensive than space sprays (particularly if sprayer costs were to be added) and give far better dispersion and control. As a result, we have reversed ourselves and are now emphasizing the use of aerosols for the control of flies, mosquitoes,

(*Turn to Page* 91)

Shock Resistance of Paste Wax

A practical laboratory method and apparatus for quantitative measurement of paste wax "strength"

By Francis E. Chapman, Dean R. Zimmerman, Paul D. Brusko*

S. C. Johnson & Son, Inc.
Racine, Wis.

THE progenitor of all modern household wax products is paste wax. With all our knowledge of paste wax technology, much still exists that we do not know about – such things as crystal lattice, solvent binding and gel strength of paste wax compositions. This paper does not seek to answer these questions but it does give a practical laboratory method and apparatus for quantitatively measuring the paste "strength" of a given composition.

The standby for years in the measurement of paste strength has been the so-called cone penetrometer.[1] At a given temperature, usually 77°F., one can determine firmness of the paste using this device. The chief disadvantage of the penetrometer measurement is that it will not give a sufficiently accurate idea of how the paste will resist the normal shocks received in shipment and handling. This is particularly important in summer months or in shipping products to tropical and semi-tropical countries with air temperatures in the 90's. If products are stored in uninsulated, poorly ventilated warehouses, or in the warm holds of ships or in the hot tropical sun of an unloading wharf, resistance to paste disruption becomes an important consideration.

Apart from these, one may want to evaluate strengths of pastes in preliminary stages of filling and cooling so that the instrumental method analysis given in this paper can be helpful. The instrument used to test the paste has been given the name of Paste Wax Shock Tester. The accompanying photographs show the instrument.

[1]ASTM Method D217-48.

*Paper presented during 43rd midyear meeting, Chemical Specialties Manufacturers Assn., Chicago, May 22, 1957.

Description of Shock Tester

THE instrument makes use of a free - swinging pendulum, mounted with two 77036 New Departure ball bearings. The pendulum is positioned so that the angle of swing can be controlled. The wing-type face plates are graduated in 10° intervals from 0° to 140°. The arm of the pendulum has a marker to indicate the angle setting. A pin device is used to set the pendulum to a predetermined angle.

The pendulum comprises 12¾ inches of ⅞ inch cold finish bar stock to which is mounted a Varigrip adjustable wing fastening ring to hold a one pound paste wax can. The seven inch long, hollow Varigrip arm is reinforced by inserting a section of 7⅜ inch cold finish rod steel to a depth of four inches, leaving 1¼ inch of threaded stub exposed for mounting. When mounted, the length of the pendulum arm from the center of the bearing to the center of the load is 19½ inches. A wing nut prevents the Varigrip section from loosening.

With the load, the pendulum is dropped so that the can strikes the rubber padded back stop at the 0° position. The rubber padding is one-half inch thick, and is classed as hi-resilient medium soft rubber, black, 372 Neoprene base (polychloroprene), 50 ± 5 durometer hardness, 1500 tensile, 500 elongatron, 30-32 pounds per square yard. It is glued to steel plate with Goodrich Vulcalock metal-to-rubber cement.

The base consists of a ½ x 11 x 17⅜ inch steel plate with adjustable legs for leveling and with slotted portions for regulating position of the 5 x 3 x 11 inch angle iron back stop. The face plate wings are attached to the base by means of a four inch wide x 5.4 lb/ft 36 inch long channel iron post.

Method of Testing

THE sample of paste wax in a one pound container is conditioned in an oven for 18 hours at the desired test temperature (preferably 100°F.). Upon removal, the container is strapped in the Varigrip and dropped from a predetermined angle so as to strike the back stop at 0° with the round side of the can. The paste in the can is then examined for evidence of paste disruption and shifting. No more than a slight shift of paste level is permissible to pass the test.

Usually with an unknown composition it is desirable to have at least triplicate samples using two to get an idea of paste strength followed by one final sample at an angle of drop just calculated to pass the test with no more than slight shift of contents. A sample once dropped should not be retested.

In the work reported here,

one lot of each material was selected for the entire study. Pastes were prepared by heating waxes and naphtha in a conventional paste wax method of processing, pouring into one pound paste wax cans and cooling under mild air circulation conditions.

Wax mixtures used in the study are as follows:

Mixture A
Carnauba, wax ..... 25% by wt.
Paraffin wax 132/134..... 75% by wt.

Mixture B
Carnauba wax ..... 20% by wt.
Paraffin wax 150/155..... 80% by wt.

Mixture C
Candelilla wax ..... 40% by wt.
Paraffin 132/134 ..... 60% by wt.

Mixture D
Sugar can wax..... 30% by wt.
Paraffin wax 150/155..... 70% by wt.

Mixture E
Gersthofen wax "OP"..... 40% by wt.
Paraffin 132/134 ..... 60% by wt.

Mixture F
Carnauba wax ..... 20% by wt.
Sugar cane wax..... 10% by wt.
Paraffin wax 132/134..... 70% by wt.

Mixture G
Carnauba wax ..... 20% by wt.
Candelilla wax ..... 10% by wt.
Paraffin 132/134 ..... 70% by wt.

Mixture H
Carnauba wax ..... 20% by wt.
Gersthofen wax ..... 10% by wt.
Paraffin 132/134 ..... 70% by wt.

Raw materials and their specifications are as follows:

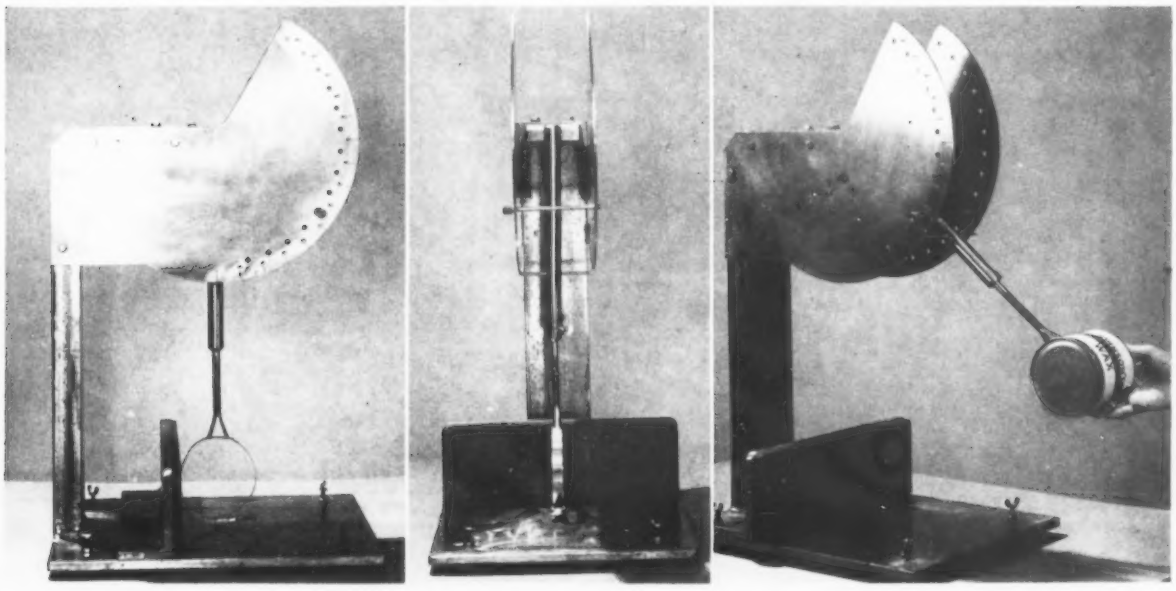
Carnauba wax, North Country T-4
Acid no. 6-12
Ash content 2% max.
Melting point 180-185°F.
Moisture content 2.0% max.
Organic suspended content 3.0% max.
Saponification number 65-85

Wax Mixture	% Non-Volatile	Angle Degrees of Shock Passed at 100°F.	Cone Penetration at 77°F.	Solvent Separation of Undisturbed Paste at 100°F. for 18 Hours
A	18	10	213	excessive
A	21	10	209	excessive
A	24	30	145	slight
A	27	50	115	trace
A	30	70	87	none
B	18	30	150	excessive
B	21	40	119	slight
B	24	60	98	trace
B	27	90	76	trace
B	30	80	77	none
C	18	..	264	fluid
C	21	..	220	fluid
C	33	10	147	excessive
C	36	50	135	slight
C	39	60	114	none
D	18	..	160	fluid
D	21	0	128	excessive
D	24	0	98	excessive
D	27	20	69	trace
D	30	30	81	trace
E	18	20	201	excessive
E	21	20	169	excessive
E	24	30	117	excessive
E	27	40	77	excessive
E	30	50	73	slight excess
E	33	60	56	slight excess
F	18	..	344	mushy
F	21	30	139	slight excess
F	24	30	115	trace
F	27	60	80	none
G	18	0	365	excessive
G	21	20	173	excessive
G	24	40	133	slight excess
G	27	50	102	slight excess
H	18	0	314	excessive
H	21	0	216	excessive
H	24	10	153	excessive
H	27	10	151	excessive
H	30	..	138	slight excess
H	33	..	130	slight excess

Data comparing shock resistance by method described with cone penetration and solvent separation.

(*Turn to Page 99*)

Paste Wax Shock Tester, left to right below, showing front view, side view and "Variable" arm holding paste wax can to be tested.



New plant of John Struthers & Co., Ltd., located in the Town of Mount Royal, Que., a Montreal suburb. Struthers is the only aerosol custom loading concern in the province and one of four located in Canada. Plant is located in the newly-developed industrial area of the Town and contains 14,000 square feet of space for production and warehouse facilities, and executive offices.

AEROSOL LOADING —

NORTH OF THE BORDER

General view of administrative and executive offices at the new plant. Seated at desk in foreground is J. E. Gardner, recently elected manager of the firm. In office in background is W. F. Struthers, who was named treasurer of John Struthers and Co., earlier this year.

New plant is equipped with two aerosol filling units, one of which is pictured above. Directly behind loading line can be seen packaged refrigeration unit, and to the left of that, the mixing tank. In the background is the bulk storage tank for propellents. In addition to the two cold-filling lines, plant also has a pressure-filling line and a line for loading glass aerosol bottles.

Picture story of a Canadian aerosol loading operation, that of John C. Struthers & Co., Ltd., Montreal, Que., Custom filler.

Shown at his desk is John Struthers, who founded and organized company early in 1953.

Automatic labeling machine labels containers after filling.

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Why not, now that annoying, tail-dodging flies are kept away with a spray formulated with LETHANE 384. Bossy is happier and so is her boss. LETHANE 384 in combination barn and livestock sprays knocks flies down fast and provides good protection between applications — convincing proof to anyone of its effectiveness.

Here are some important qualities that LETHANE 384 will impart to your barn and livestock spray.

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- Economy — inexpensive formulation without sacrificing quality

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Storage facilities at Mount Royal plant are equipped to handle both finished goods and raw materials. Finished products are stored for customer until shipping date and then sent in bulk lots to their various warehouses and distribution points.

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Epolene "E" makes polishes SLIP-RESISTANT

No anti-slip agent needed

Polishes containing anti-slip agents are safer to walk on but easier for water to spot. Anti-slip agents aren't needed, however, when you base your formulation on Epolene "E." This polyethylene wax has a natural "built-in" slip resistance.

Result: a polish with exceptional slip-resistance *plus* maximum resistance to water spotting.

Now, thanks to Epolene, you need not compromise between a safe wax and a water-resistant wax.

Epolene produces floor polishes that exhibit, in addition to slip resistance, outstanding durability and high gloss. Tests show that Epolene polishes—following a period of normal traffic and rebuffing—actually increase in gloss.

Epolene is Eastman's new low-viscosity, low-molecular weight polyethylene wax, especially produced to meet the exacting requirements of emulsion type polishes. It is hard, tough, and non-discoloring. It is compatible with most waxes, resins and elastomers. Epolene compares favorably with costly waxes such as carnauba, yet it is available from a dependable source at a stable price, unlike many natural waxes.

Manufactured under carefully controlled conditions, Epolene is consistent in quality, shipment after shipment. Thus, you can standardize your formulas and procedures with complete confidence in batch-to-batch uniformity.

Still another advantage. Epolene is supplied in small pellets that handle easily...melt rapidly...blend readily.

Epolene is available also in a non-emulsible form—Epolene "N"—for use in paste polishes. Eastman will be glad to show you how you can take advantage of these new waxes in your formulations. Write today for samples and literature. EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Epolene

EASTMAN POLYETHYLENE WAXES

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Mass.; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

Figure 1. Applying wax to roughly same amount of area on the driver's side of the hood as on other sections of the car.

New tool for testing

Automobile Waxes and Polishes

Radioactive tracers provide answers to the question of the relation of thickness of wax film to durability of different formulations.

RADIOACTIVE tracers have been used for so many interesting and unusual applications in the last few years that it should come as no surprise to anyone that these remarkable little atomic snoopers have now been put to work measuring the thickness and durability of automobile waxes and polishes. The tracer technique was first considered by the authors when it was found that certain paste wax formulations, based on pure carnauba wax and containing a high proportion of silicone, consistently gave polished films more than twice as heavy as conventional formulations of blended waxes with little or no silicone. This interesting fact was determined by simple before-and-after weighing of small laboratory paint panels polished with the various waxes under test. The double thickness was attributed largely to the high silicone content of this particular type of formulation. With such a formula, the wax could be spread on a surface and allowed to dry, solvent-free, before being buffed to a shine. In this way less of the original material was wiped off the surface during buffing. The silicone also acts as a lubricant, obviating the need for soft waxes or plasticizers in the formulation. It reduces the need for rubbing or buffing, which tends to remove even more of the wax.

In any case, this phenome-

By John D. Saunier*,
"Insul-Ease" Product Manager,
and
Leon Kresser,
Director of Research and Development,
Authority Laboratories, Div. of Bardahl Oil Co.

* Paper presented during 43rd midyear meeting, Chemical Specialties Manufacturers Assn., Chicago, May 22, 1957.

non appeared to warrant further study. It was recognized that the original method of measuring the weight or thickness of the wax film had two obvious shortcomings: (1) The weight of the wax film being extremely small, compared with the weight of the paint panel, is difficult to measure accurately; and (2) hand application of the wax to a small panel is quite different from waxing the surface of an automobile. It might be noted, however, that the laboratory results were surprisingly reproducible. They checked very well with the radioactive test data later gathered. This point is mentioned because it gives the investigator an excellent method of screening formulations before selecting the desired ones for radioactive testing.

Since we did not have a "hot lab" at our disposal, we had comparative tests run by Tracerlab, Inc., Boston, to determine relative film thickness of five different types of wax formulations:

(1) Paste wax, solvent type, No. 1 yellow carnauba wax only, with high silicone content;
(2) Paste wax, solvent type, blend of hard and soft waxes, with low silicone content;
(3) Paste wax, water-and-solvent type, a low-solids blend of wax and resin, with low silicone content;
(4) Paste wax-and-cleaner, solvent type, blend of waxes with abrasive and cleaning ingredients, with moderate silicone content;
(5) Liquid wax, solvent type, low solids content, high silicone-to-wax ratio.

Each formulation was "tagged" with radioactive cobalt naphthenate, the cobalt-60 tracer element being added in proportion to the solids content of each formulation. The thickness of the residual film was then determined by Geiger counter measurement of the radioactivity on the polished surfaces.

Before we get further into our discussion of the radioactive tracer tests themselves, and how they were performed, it should be made clear why they were performed. This brings up the question, "What does wax film thickness mean, and why, or when, is it a measure of quality?" The answer is not self-evident.

Let us consider for a moment the average car owner's criteria for satisfaction with a wax or polish. First and foremost, of course, is gloss—the initial appearance of shine and beauty. The ease with which this primary goal may be achieved by many types of polish products often clouds the judgment of the car-owner. He fails to consider whether he is getting any protection from the product, or if he will have to polish the car again in a short time, to keep it looking shiny. For the thoughtful car owner, though, there are other criteria besides initial gloss and ease of application. He thinks of gloss retention, or how long the shine will last through weathering and washing; he thinks of dirt pickup, and whether it is easy to wash off without removing the wax; he thinks of prevention of oxidation, or chalking and fading of colors, and a few car owners—all too few—actually consider the life of the paint, and the desirability of protecting it from deterioration from other than the standpoint of appearance alone.

With these criteria in mind, it becomes apparent that thickness by itself is only an indication of *potential* quality, which may be nullified by other undesirable features. For example, extra thickness in a soft wax film would be undesirable because of smearing and dirt imbedment; in a dark-colored wax, too thick a film would appreciably darken light-colored finishes; and in the one-step type of product, too thick a film would probably appear dull or unclear because of trapped dirt, dead paint, and cleaner residue. Thus, wax film thickness is a measure of quality only if the product is used on a pre-cleaned surface, and contains no solids not designed to be in the final film; if it is light in color, retains gloss uniformly, resists dirt pickup and imbedment, is easy to keep clean, and retards oxidation and fading,—and if it performs all these functions better and longer in proportion to the thickness. So the purpose of our radioactive tracer tests was to try to relate these many product qualities (which are determined largely by subjective observation) to a specific property; wax film thickness, and to note the variation in this property in different types of formulations.

With the foregoing discussion of the stimulus and purpose

Figure 2. Here wax is applied to the trunk of the car.

of these tests setting the scene and general scope of the study, we are ready now to consider the procedures of selection of the radioactive tracer, preparation of materials, application to test car finishes, instrumentation and measurements and, finally, interpretation of the results.

Selection of Tracer

SELECTION of a suitable radioactive tracer involved a great many interrelated considerations. Let's look at some of the requirements; First, the tracer should truly represent the wax film—all of it—and should not change the properties of that film by virtue of its presence in it. Second, the tracer should be sufficiently radioactive, and have a long enough half-life, to give good reading levels at extremely small concentrations and over the desired period of time of testing. At the same time it should not be unnecessarily dangerous to handle from a health standpoint. Third, the tracer must be available in a useful physical and chemical form, or readily convertible to such a form, so that it may be incorporated into the products under test in such a way as to permit observation and interpretation without affecting the integrity of the products themselves.

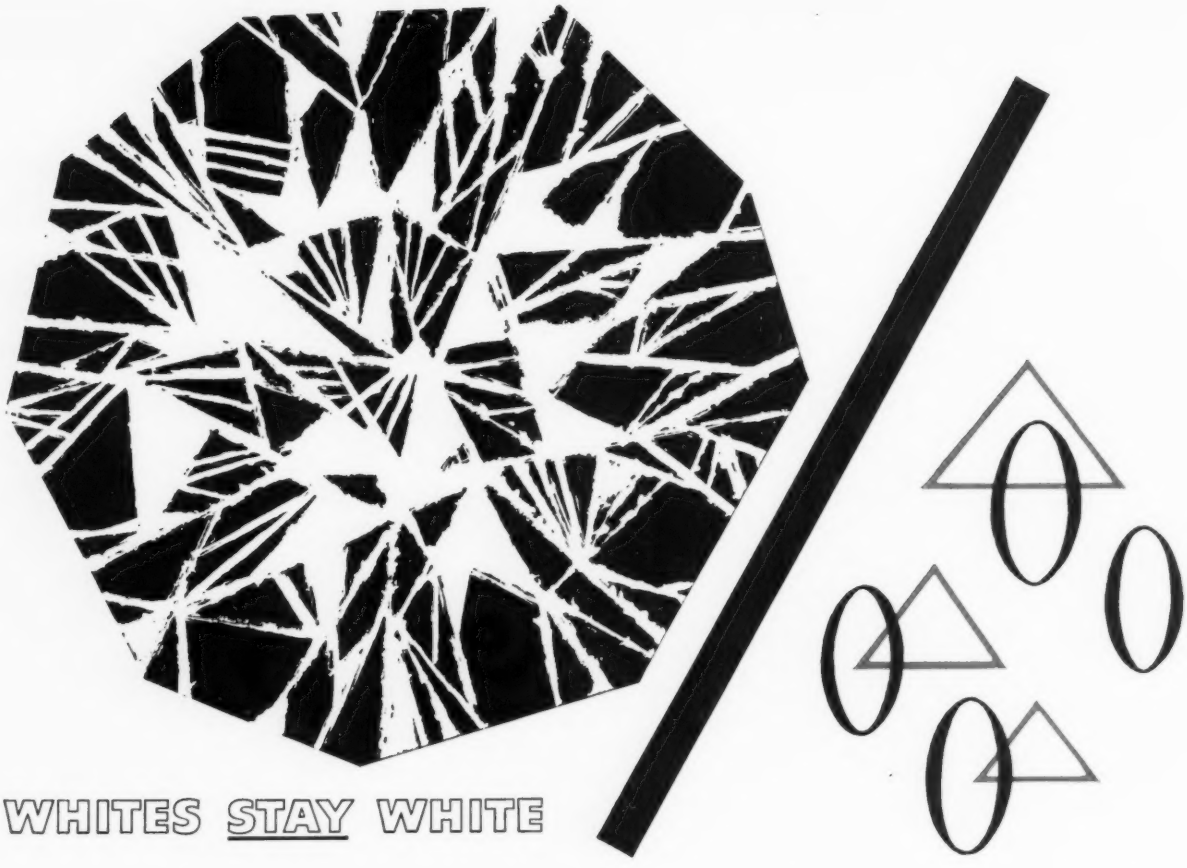
There were two basic modes of operation to follow: one was to "label" or "tag" one of the actual ingredients common to all the formulations under test, and assume that that ingredient remained associated with each product uniformly throughout its service life; the other was to add to the products a foreign ingredient which would disperse uniformly, associate itself with the film without changing it, and remain associated with the film throughout its service life. At once it can be seen that either choice is quite a large order. Because of the variables involved, we tried to use both methods, with the idea of checking one against the other. We attempted to "label" a silicone fluid with carbon-14, to use as the actual "tagged" ingredient, and we also developed an additive tracer compound, cobalt naphthenate. The latter, using cobalt-60 as the radioisotope tracer, worked out very well, and provided the data reported in this paper.

The carbon-14-tagged silicone tracer was eliminated for two reasons; one was theoretical, involving the question of whether the silicone would disappear at the same rate as the wax. The other reason was practical; it didn't work! At least, it didn't work on schedule. However, we are confident that it can be made to work, and it offers interesting possibilities for future tracer tests. But, for the purposes of our study, we had to forego the necessary re-runs because of the time required to resynthesize a "hot" silicone fluid starting from basic raw materials.

The choice of cobalt naphthenate as the additive tracer was made after an exhaustive search of the available radioisotopes and their potential compounds. Generally speaking, cobalt-60 is not considered a desirable tracer element for the proposed type of work because it is a strong gamma emitter as well as a good beta source. To explain this briefly for those not familiar with radioactive materials; beta "rays" are beams of electrons resulting from the decay of radioactive atoms; they are easily detected when in thin films such as the wax films we are considering, and are relatively safe to work with since they can be shielded by small thicknesses of low-density screens, such as transparent plastic sheets. On the other hand, gamma rays are relatively dangerous to work with since they are deeply penetrating and require substantial thicknesses of high-density screens, such as lead blocks, for adequate shielding. Further, the use of the relatively heavy metal, cobalt, offers potentially greater health hazards than carbon because of the physiology of its absorption into the system upon accidental ingestion. However, because cobalt-60 is extremely active, with a long half-life, and could be used in minute quantities as a tracer, it was checked further for its useful compounds. Cobalt naphthenate, otherwise designated as the cobalt salt of cyclohexanecarboxylic acid, or hexahydrobenzoic acid, could be synthesized readily from pure cobalt wire, irradiated in the Oak Ridge atomic pile. Also, the naphthenate has a deep purple color which makes it suitable for "cold" or nonradioactive testing for dispensation in the test formulations.

The following work was done at Tracerlab, Inc., in its Boston laboratory. Dry runs were made on the five waxes to be tested

Figure 3. After all waxes had been applied, at least five readings were taken in each area for each wax.



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Product Y	2.9R	11Y

TENNESSEE-EASTMAN TEST—LOV. 5¼"		
Armour	2R	12Y
Product V	4.5R	18Y
Product W	4.4R	18Y
Product X	4.0R	20Y
Product Y	3.8R	16Y

SULFURIC ACID TEST—GARDNER COLOR	
Armour	1
Product V	2-3
Product W	6-7
Product X	4
Product Y	2-3

SPECIFICATIONS	Min.	Max.
Iodine Value	5	7
Acid Value	208	211
Titer, °C	53.9	54.4
Color, Lovibond (5¼")	—	0.5R-2Y
COLOR STABILITY (5¼")	—	4.0R-3OY
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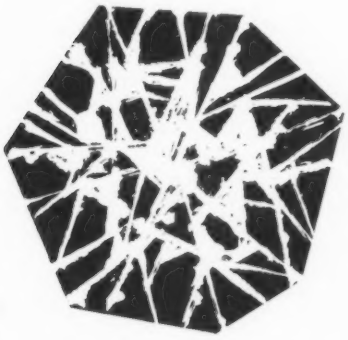

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with "cold" cobalt naphthenate which was dissolved in Stoddard solvent. A pre-determined amount of each of the wax samples was weighed and then heated until it had melted, with care being taken not to raise the temperature too high. A pre-determined amount of cobalt was thoroughly mixed into the warm wax, the wax was cooled close to its setting point, and allowed to set into a hard paste. The solidified pastes were examined to ascertain if the cobalt naphthenate, which was purple, was distributed homogeneously throughout the paste. In the case of the liquid wax, the cobalt napthenate was added to the material and the mass shaken well to distribute the cobalt naphthenate uniformly throughout the wax.

All samples were then tested by application and polishing to be sure that they behaved exactly as the untreated wax. This appeared to be the case with all the samples. Total solids were run on all samples to determine the amount of non-volatile film-former in each sample of paste wax and liquid wax. This was simple in the case of all the waxes except No. 4. In this case, the abrasive material had to be extracted from the wax and this amount had to be subtracted from the total solids.

It was then determined that it would be too difficult to get equivalent amounts of radioactive cobalt naphthenate into each wax according to their total solids. Therefore, in the final test, predetermined weights of the waxes were taken. To each was added the same quantity of radioactive cobalt naphthenate, and corrections were made for the differences in proportion of cobalt naphthenate to total solids.

After the preliminary checking of "cold" samples appeared to be successful, the radioactive waxes were prepared.

A 1955, two-tone green Packard automobile was thoroughly washed and dried and the radioactive waxes were applied to three areas of this car.

The waxes were applied on roughly the same amount of area on the three sections of the car (Figures 1 and 2), (1) on the driver's side of the hood, (2) on the left side doors, and (3) on the trunk. The hood and the side door were finished in highly pigmented pastel green lacquer. On the trunk, or rear deck, was a metallic green lacquer, with practically no pigment other than aluminum flake.

After all the waxes had been applied, at least five readings were taken in each area for each wax (Figure 3). They were averaged and corrected for concentration of radioactive material and a report was sent to us on the results of this phase of the work by Tracerlab, Inc.

We were able to determine the relative thickness of the waxes in comparison to each other, as shown in Figure 4. These results checked very closely with the results found originally in the laboratory by weight measurements.

As can be seen from this table, the relationship between the thickness of the waxes checked very closely in all three areas, considering that this method of counting radioactivity has an inherent 10 per cent inaccuracy.

After this test, in the following two weeks, the car was driven approximately 2,000 miles. It went through a blizzard. It traveled for over 500 miles along roads covered with slush, cinders, and salt. During most of this driving, the speed of the car was kept at between 60 and 70 m.p.h. At the end of this period, the car was washed with cool water, thoroughly dried, and Geiger counter readings were taken at the Washington University Radiation Laboratories in St. Louis. A Geiger counter of the same type that had been used in the previous test was used to repeat the readings. It must be noted at this point that although the same type of Geiger counter was used for both of these series of measurements, there is an inherent difference in the geometry of these instruments. Although one instrument may give

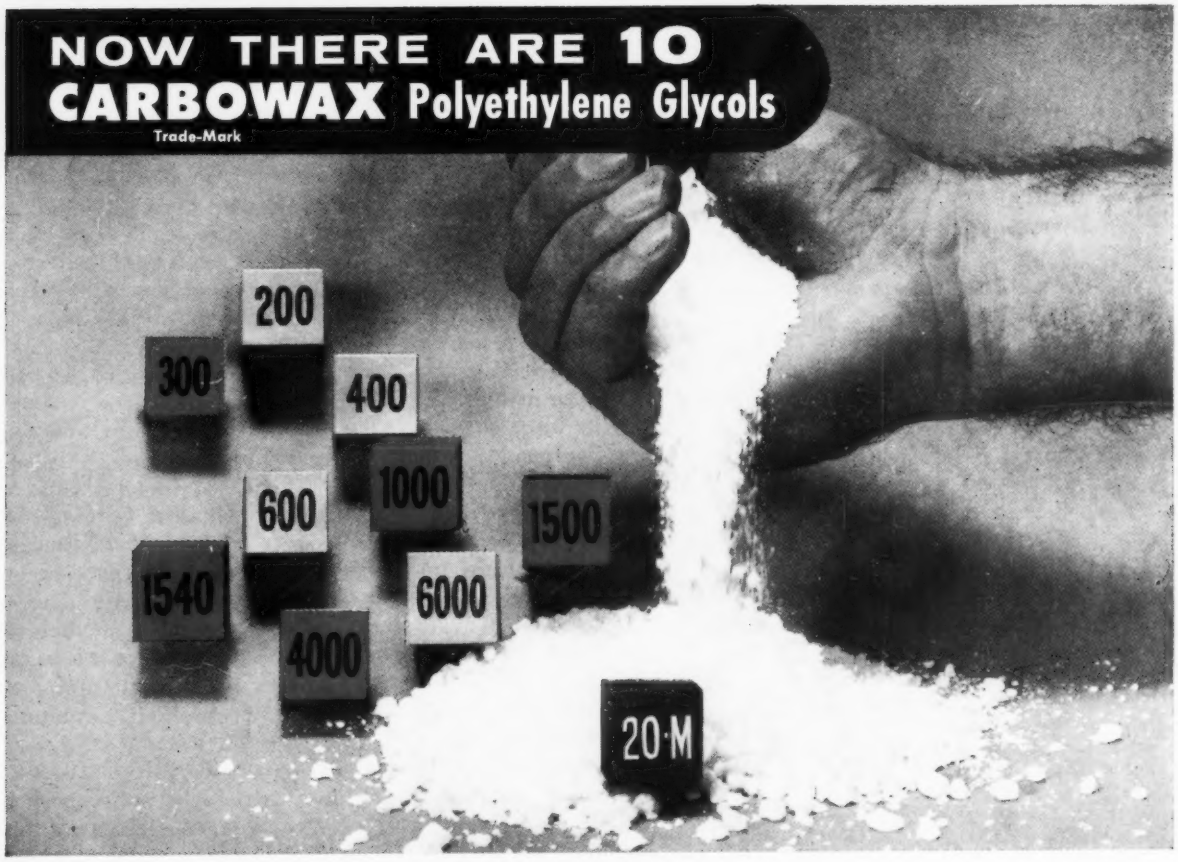

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FIGURE 4—Radioactivity Readings of Polished Surfaces—Initial

	Wax "1"	Wax "2"	Wax "3"	Wax "4"	Wax "5"
Hood—Pastel Green					
Counts per minute (Cpm)	1720 ± 190	600 ± 40	1790 ± 230	430 ± 40	860 ± 50
Rel. conc. of Cobalt-60 (Wax "1" = 1)	1.00	0.75	1.98	0.92	1.61
Cpm corrected for conc.	1720	800	905	467	534
Relative solids Thickness	**1.00**	**0.47**	**0.53**	**0.27**	**0.31**
Doors—Pastel Green					
Counts per minute	2170 ± 170	760 ± 50	1300 ± 150	660 ± 30	725 ± 100
Cpm corrected for conc.	2170	1010	660	720	450
Relative solids Thickness	**1.00**	**0.47**	**0.30**	**0.33**	**0.21**
Deck—Metallic Green					
Counts per minute	1460 ± 60	300 ± 20	1140 ± 190	500 ± 90	670 ± 50
Cpm corrected for conc.	1460	400	575	545	415
Relative solids Thickness	**1.00**	**0.27**	**0.39**	**0.37**	**0.29**
Average of Relative Solids Thickness	**1.00**	**0.40**	**0.40**	**0.32**	**0.27**

consistent and comparable results in all its measurements, the readings from two different instruments cannot be compared quantitatively. Therefore, the readings taken at St. Louis were inherently different from those taken at Tracerlab, but they indicate the same relationship between the wax films.

Shown on Figure 5 are the readings taken with the Washington University Geiger counter. As may be noted, there was a considerable amount of wear during this period on all the waxes although the exact amount cannot be determined from the readings. However, it may be seen that the ratio of wax No. 1 to the other waxes increased during this period, showing definitely that it had lost relatively less wax than the other sample films. Figure 6 summarizes the two sets of data.

FIGURE 5—Radioactivity Readings of Polished Surfaces—After 2000-Mile Winter Driving Exposure

	Wax "1"	Wax "2"	Wax "3"	Wax "4"	Wax "5"
Hood—Pastel Green					
Counts per minute (Cpm)	206 ± 40	62 ± 3	245 ± 50	62 ± 6	65 ± 25
Rel. conc. of Cobalt-60 (Wax "1" = 1)	1.00	0.75	1.98	0.92	1.61
Cpm corrected for conc.	206	83	124	67	40
Relative solids Thickness	**1.00**	**0.40**	**0.60**	**0.33**	**0.19**
Door—Upper Half—Pastel Green					
Counts per minute (Cpm)	295 ± 25	15 ± 5	30 ± 10	.....	63 ± 10
Cpm corrected for conc.	295	20	15	.....	39
Relative solids Thickness	**1.00**	**0.07**	**0.05**	.....	**0.13**
Door—Lower Half—Pastel Green					
Counts per minute (Cpm)	137 ± 25	5 ± 0	.....	18 ± 3	.....
Cpm corrected for conc.	137	6.7	.....	19.5	.....
Relative solids Thickness	**1.00**	**0.05**	.....	**0.14**	.....
Deck—Metallic Green					
Counts per minute (Cpm)	118 ± 10	46 ± 4	78 ± 2	48 ± 6	21 ± 4
Cpm corrected for conc.	118	61	39.5	52	13
Relative solids Thickness	**1.00**	**0.52**	**0.33**	**0.44**	**0.11**
Average of Relative Solids Thickness	**1.00**	**0.33**	**0.33**	**0.20**	**0.14**

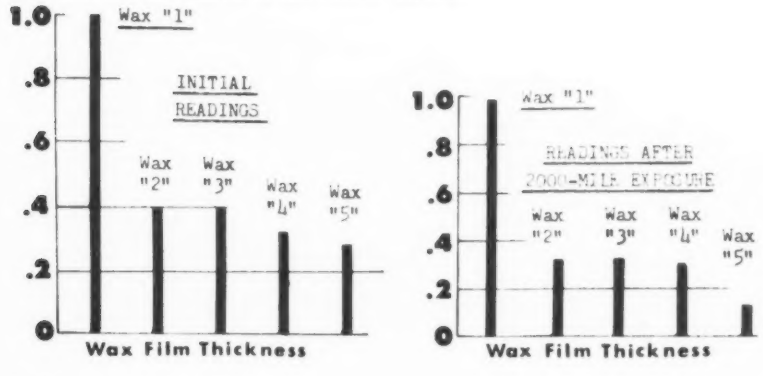
Figure 4, which shows the initial readings on the polished surfaces. The first figures given are the counts per minute as registered on the Geiger counter. The count shown is the average of the five readings taken on any given surface. The plus or minus figure indicates the variation between the lowest and highest readings and does not take into account the inherent instrument error. These readings have had the background count (approximately 30 c.p.m.), deducted. The over-all picture shows wax No. 1 having a film more than twice as thick as the next heaviest wax and more than three times as thick as the poorest of these.

Again examining Figure 5, note that separate counts were taken on the upper part of the door panel and surrounding areas, and on the lower part of the door and surrounding area. The figures on the lower part of the door, which had a great deal more traffic wear than the upper section, are considerably smaller. The figures for the rear deck are also quite low. This metallic lacquer itself could be removed by just rubbing with a damp rag. The figures for the hood are quite high. An average was taken of all these areas, and after the 2,000 mile weathering exposure, wax No. 1 was shown to have at least three times the thickness of the other paste waxes and more than five times the thickness of the liquid wax.

Finally, one more set of readings was taken. After six months of aging, in which the car had traveled about 12,000

(*Turn to Page* 91)

Figure 6. Radioactive Tracer Testing of Auto Wax Thickness and Durability—Summary of Results: Bars represent average of readings from hood, door and rear deck, equally weighted. Thickness is assumed directly proportional to counts per minute on Geiger counter. Measurements are relative only. Wax "1" thickness = 1 is arbitrary basis. There is no correlation between linear scales of graphs 1 and 2; absolute measurement of film thickness is beyond the scope of this study, and Geiger counter geometry does not permit comparison of measurements of two different instruments.



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AEROSOLS...

Past, Present and Future

THE three papers appearing on this and following pages were presented as part of a symposium commemorating the tenth anniversary of low pressure aerosols. The remainder of the papers, presented as part of the symposium, will appear in the August issue of *Soap & Chemical Specialties*. The symposium was presented at a joint meeting of the Insecticide and Aerosol Divisions during the 43rd midyear meeting of the Chemical Specialties Manufacturers Assn. in Chicago, May 22.

Aerosol Containers

By John M. Heinen, Jr.,
Manager, Packaging Engineering,
Continental Can Co., Chicago

IN the animal world, the age at which any particular breed comes to maturity varies widely. Some turtles, for instance, may be young at the age of 50 years while the entire life span of certain insects may be only a matter of hours or days. So it is in the business world, particularly in the field of packaging. Some excellent ideas never become fully developed; others with little apparent merit may reach general acceptance overnight only to fade out equally fast; while still others enjoy a steady growth and ever-increasing popularity. Aerosols, for example, were mothered by wartime necessity, carefully nurtured by hopeful entrepreneurs in the period immediately following World War II and now in this their tenth year of commercial acceptance have reached maturity.

The name "aerosol" is commonplace today and, what is more important, people use aerosols, they want them, they *buy* them and in rather astounding quantities. Retail sales of aerosol packages reached an estimated $320 million last year in the United States and Canada and these products are just beginning to hit their stride. This meteoric rise has been due to steady progress in the development of containers, valves and propellants as well as continuing advances in product formulation.

Generally speaking, the term "aerosol" is applied to those products which derive their dispensing pressure from a liquefied gas propellant in direct contact with the product. From a commercial standpoint, foams as well as air-borne and surface deposited sprays of either liquid or powder are properly classified as aerosols. Pressurized food products such as whipped cream use a compressed gas as the propellant — usually a mixture of nitrous oxide and carbon dioxide. Pressure packaging would then be a general term which could apply to all products packed in containers with an internal pressurized atmosphere which serves the purpose of expelling the contents.

Let's take a quick look at the background of these rapidly growing products, particularly from the standpoint of the container. The story of the development of the original high-pressure "bug-bomb" by Goodhue and Sullivan and its subsequent use by the military during World War II is too well known to be repeated here. Suffice it to say that 40 million, one pound liquefied gas aerosols were used with striking success.

Even before the end of the war it was quite evident that the heavy, cumbersome, expensive military aerosol bomb would have to be replaced by a much simpler and less costly package if this unique method of dispensing insecticides, and perhaps other products, was to find a place in the civilian market. The container industry picked up the challenge of providing a throw-away container which would retain the convenience aspect and functional characteristics of the heavy welded steel "bug-bomb" but would be light in weight, easy to fill, simple to operate and, above all, less costly.

The natural initial choice of a container which would meet these requirements was the beer can which was in fact a pressure container. It would not, however, withstand the high pressure (70 p.s.i. gauge at 70°F.) then in use. The most obvious and practical approach was to reduce the pressure in the aerosol container without sacrificing performance in terms of killing power. The two-piece drawn container made by Crown Can Company offered immediate possibilities. Continental Can Company meanwhile developed the three-piece soldered side seam beer can container into an aerosol container. Our aim was to obtain the desired killing power of the insecticide by the use of a propellant pressure low enough to permit the use of the cheapest possible container. Strengthening the can body of the three-piece can by structure and manufacturing improvements was relatively simple, but perfecting the valve was another matter. The ideal valve had to: 1) be low in cost, 2) provide a suitable aerosol spray at a lower pressure, 3) provide consistent performance, 4) be readily assembled, and 5) be easily operated. No such valve was available and entry of the three-piece can on the market was delayed for nearly a year while we designed and built a low cost valve to do the job. The result was Continental's "Fingertip" dispenser with a soldered valve which operated at a pressure of 25 to 35 p.s.i. gauge at 70°F. and proved to be a highly successful aerosol container for many years. I might add that Continental later went out of the valve business since other manufacturers soon entered the field and took over the task of designing special purpose valves for the myriad products which followed in the wake of the successful marketing of insecticides.

So much for the historical background. Now what about today's containers? Originally only steel (both tin plate and black plate) met the exacting requirements for aerosols and the 12 ounce size was the standard — adapted from the beer can.

(*Turn to Page* 85)

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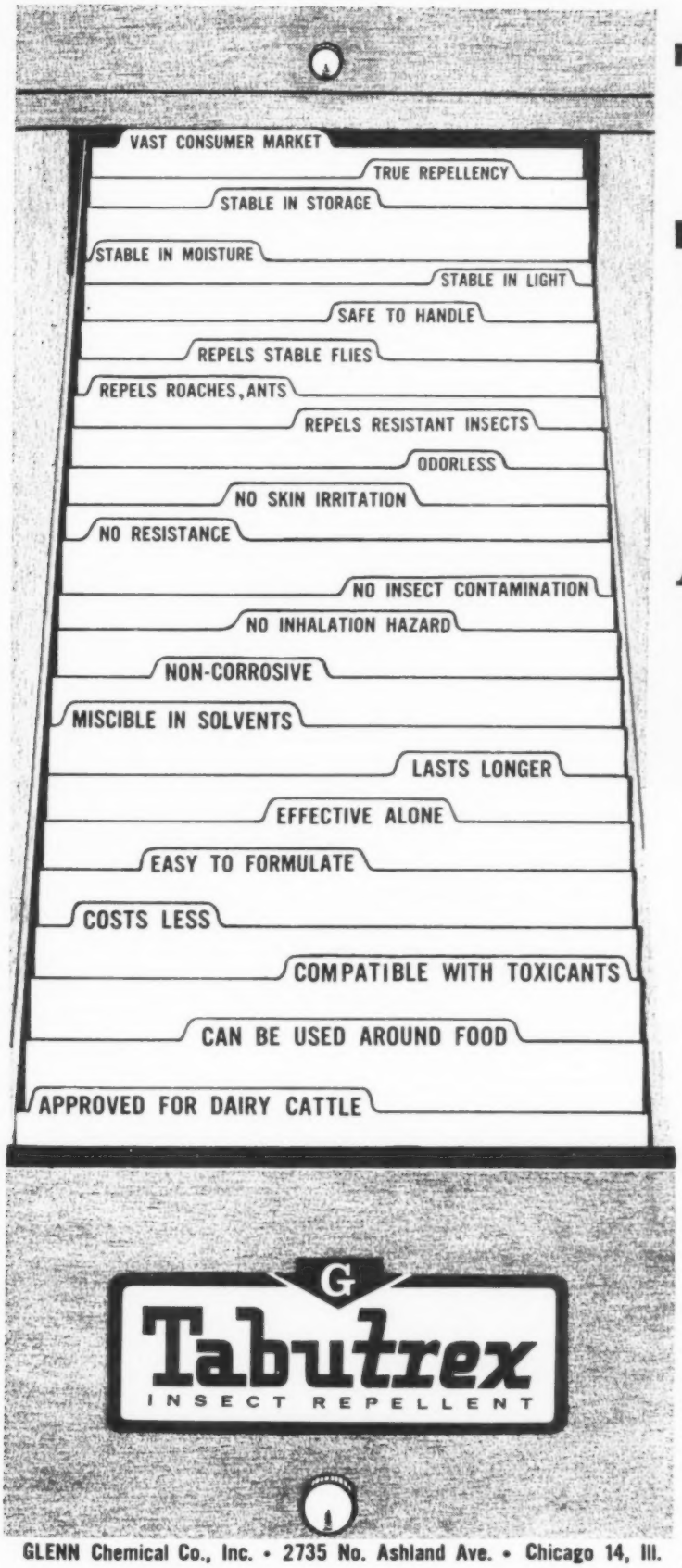

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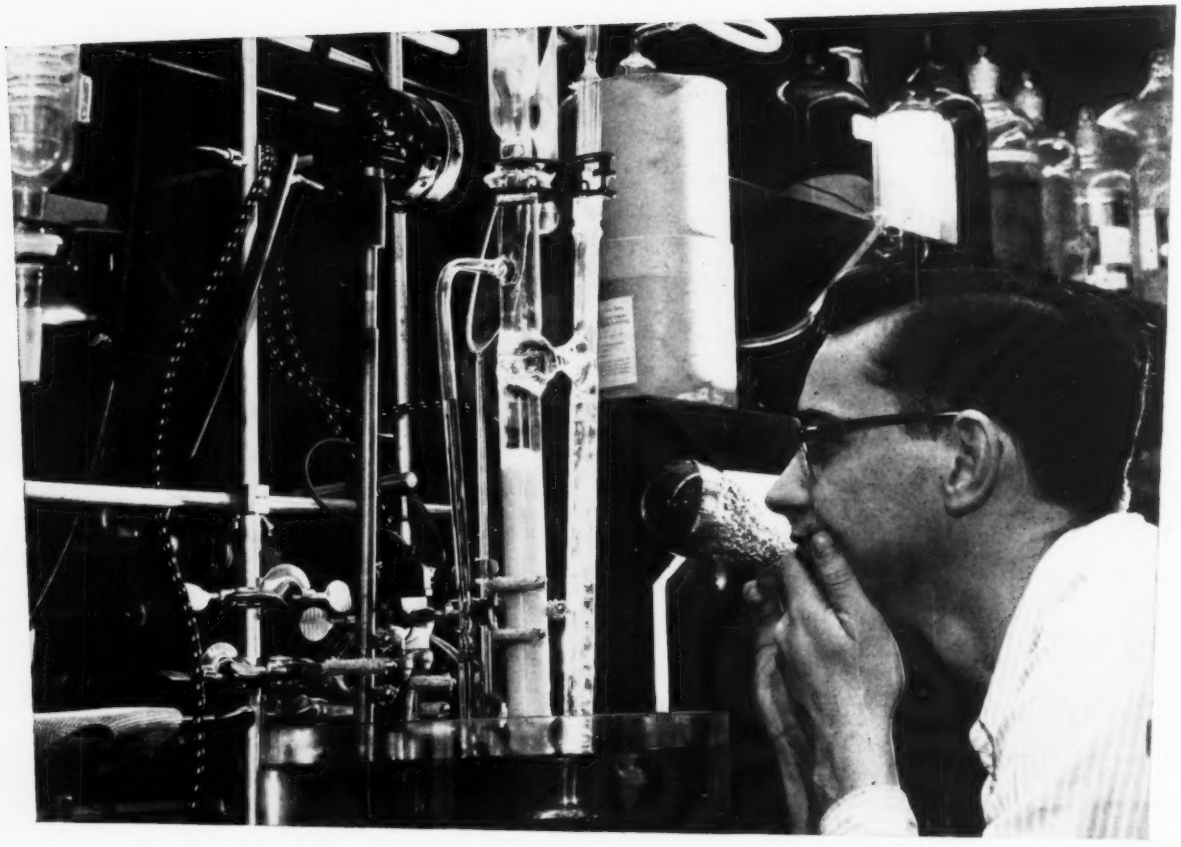

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Aerosols — **Past, Present, Future**

(*From Page* 81)

Today steel cans are being made in three, six, eight, 12, 14 and 16 ounce sizes. While steel still offers certain advantages, other materials have put in their appearance in the last few years especially for the smaller sizes. Glass aerosols are on the market ranging in size from one-half to four ounces. Plastic containers have been made up to four ounces and are likewise expected to find a place in the market. Small aluminum containers have joined the parade in the United States and aluminum containers of many sizes have been in extensive use in Europe for some time.

Packaging requirements are never static. They are constantly changing. When the unromantic, higly utilitarian and still novel aerosol can moved into milady's boudoir with a hair lacquer, a new and very demanding requirement appeared on the scene. The package now must "belong" in new company, a different room, a different atmosphere. The insecticide can is a misfit here.

Emphasis is put on appearance. Color, size, symmetry, eye appeal all become very important. In spite of what some husbands may think, the wifely, toil-stained hand that grasps the insecticidal aerosol in the kitchen with a glittering eye of deadly intent on a meandering fly is not at all the same, soft, carefully-manicured hand that daintily reaches for the aerosol hair lacquer, perfume or anti-perspirant in another part of the house. Likewise, it should be remembered that merchandising has changed drastically over the last ten years. With the pronounced trend toward supermarkets, we find that the container is the best, and very often the only, salesman. Consequently, size, shape, color, shelf appeal, eye appeal, label attractiveness, symmetry and contour all become important factors to be added to the previous demanding performance requirements of the aerosol container. These are the factors which have led to marked improvements in the steel aerosol container and these are likwise the factors which have provided the opportunity for glass, aluminum and plastic to join steel in the aerosol container field. All of these offer possibilities for a new and a different look, at a price.

Container requirements for aerosols must be carefully considered and compromise decisions must be made in order to come up with the best container for the specific purpose, product and market involved. Cost, strength, weight, appearance, cost of handling, ease of handling, ability to be decorated, ease of filling, corrosion resistance, flexibility with respect to different valves, and quality control factors must all be considered in a final analysis of the choice of container for a particular product.

The Future

WE who have been a part of this dynamic aerosol growth may be tempted to look back nostalgically at our past achievements. We may sometimes gaze with pride, and perhaps rightfully so, at the tremendous number and variety of aerosol products now occupying the shelves of the hardware stores, the drug stores, the cosmetic counters, the department stores and the supermarkets. But we cannot afford to be complacent. There are still more unexplored opportunities for aerosol packaging. Practically none of the existing markets are saturated and many others have not even been touched. On the basis of the present rate of growth, many people have estimated a production of 600 million aerosol units in 1960 and I for one feel that one billion units is not too unrealistic. What are some of the things we can expect in the next few years?

1. *Container Materials* — Steel has been the leader but glass, aluminum, plastic and perhaps paper will be used more extensively. Composite containers, that is, containers made of more than one of these materials, are practically a certainty. The particular properties of each will be used to advantage.
2. *Convenience* — There is no question but that people are getting lazier and lazier and are willing to pay for convenience. Perhaps not so well understood, however, is the fact that the American consumer is not just interested in the gimmick or novelty aspect. He or she is interested in things that will really save time or will offer some other plus factor. Hence, emphasis can be expected on factors that will not only offer initial attraction but assist in obtaining repeat business.
3. *Appearance* — The requirements of the personal cosmetic field as well as supermarket merchandising and the push-button shopping of the future will continue to emphasize the need for visual salesmanship in the container.
4. *Shape* — While still greater diversity in the shape and size of containers can be expected, it must be remembered that this trend can mean higher costs and as a result some pressure will be exerted for standardization.
5. *Size* — In the packaging field, there is generally a marked trend toward unit packaging and multi-unit packaging on the one hand and toward the large, economy, king-size or household size package on the other. These cross-trends have already been evident in the aerosol field and they are expected to continue. The merchandising of functionally related aerosols in kits of two, three or even more containers can be expected.
6. *Pharmaceutical Aerosols* — This group is still in its infancy and we can look for tremendous gains in this field in the next few years.
7. *Pressurized Foods* — The biggest volume gains in the pressurized dispenser industry will perhaps be in the food field. Here is a practically virgin territory and, while many problems are present, the rewards can be very gratifying. As a matter of fact, the successful packaging of pressurized foods other than whipped cream is no longer a dream. Our laboratories, working in cooperation with valve manufacturers and other suppliers, have produced experimentally a complete package which will do the job. Some difficulties yet remain but these are in the refinement category. Barbecue sauce, meat tenderizer, ice cream topping, table syrup, and an endless number of other products are already in the offing. Some of them will be a commercial reality before the end of the year.

Having taken a look at the past, present and future of aerosols from the container standpoint, we cannot help but be impressed, not only with the progress made during the first 10 years, but also with the opportunities for additional growth in the next ten.

More and increasingly complex problems will confront the container manufacturer as attempts are made to package new and improved products in aerosol dispensers. Packaging requirements will become increasingly more demanding but the container industry is prepared to meet this challenge and supply a steady stream of new, different and improved containers which will satisfy pressure packaging requirements.

Aerosol Propellants

By Winston H. Reed, Ph.D.
Reed Research Corp.
Shelton, Conn.

IN 1947, the insecticidal aerosols of the high pressure type, using propellant 12 alone, were the only commercial aerosol products. It should be remembered that the pioneer manufacturing companies in this business had at that time three years of experience in the production of military pressurized insecticides. Their laboratories had already been experimenting with the application of this new dispensing method in a variety of products.

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pressurized room deodorant and the move to the so-called low pressure container. The principal propellant mixture now became propellant 12/11 (50:50 wt.%), having a vapor pressure of 35°F. psig. Propellant 11 was used with propellant 12 merely as a suitable diluent to lower the vapor pressure to that which had been standardized for the low pressure cans. Methylene chloride was soon introduced as a lower cost substitute in total or in part for the propellant 11 used in these mixtures. By this time, which we now consider as almost the beginning of consumer aerosols, a variety of developments and propellant agents had been suggested to lower both the cost and amount of propellant employed.

Rotheim,(1) in his truly pioneering concept of pressure packaging, which he developed in the 1930's, had considered a variety of propellant agents. Scientists (2,3,4) of the U.S.D.A., in bringing this idea by an independent path to a commercially practical product, had also considered and worked with various propellants. By this time, consideration had been given to the hydrocarbons, such as butane, propane, methyl chloride, methylene chloride, dimethyl ether, vinyl chloride, carbon dioxide, sulfur dioxide, ammonia, nitrous oxide, air, nitrogen, helium and similar gases, as well as the available range of low-boiling point chlorofluorohydrocarbons. Attention and application first centered on the last class of components because of their advantages of non-toxicity and non-flammability.

All of the liquified propellants possessed certain distinctive advantages over the non-liquified compressed gas systems, such as CO_2, nitrous oxide, nitrogen, etc. These advantages were that, for any given pressure limit such as the standard 40 psig container, a much larger expansion ratio and more available work energy was provided by the liquified gases, and further the pressure remains substantially constant as the package is used up. For example, propellant 12, packed in a standard 12-ounce container, undergoes an expansion of approximately 255 volumes in changing from a liquid to a gas and provides available energy in that expansion. Methylene chloride undergoes an expansion of 776 volumes in going from a liquid to a gas but, because its vapor pressure is less than atmospheric, it provides no driving force. Compressed gas, on the other hand, such as nitrogen, even at 60 pounds absolute, 45 pounds gauge, would only have an expansion ratio of three volumes.

The commercially acceptable products, in 1947, contained 85-95 wt.% propellant. Economic advantages to be gained from reducing the amount of propellant had been recognized at that time. It is a well understood fact that, in a single phase system, the vapor pressure is approximately equal to the sum of the partial vapor pressures of each component. Thus, it was appreciated, that in such systems there was a practical limit of dilution of the high pressure components, below which one could not go without sacrificing spray performance. Two liquid phase systems, however, were free of such limitation. A small amount of the pressure producing propellant would exert its vapor pressure, independent of the second liquid phase immiscible with it.

Dr. Winston H. Reed

Because water is an excellent solvent for many things which cannot be dissolved in oil-propellant systems, and because of the obvious economic advantages, attempts were made even prior to 1947 to produce acceptable pressurized sprays, using two such liquid phase systems.

Early in the development of aerosols, work had been started along these two major avenues for reducing propellant costs; one, by the use of cheaper diluents in one phase system; two, by the use of two liquid phase systems.

The present status of work on propellants is too well known to require but the briefest of reviews. The major suppliers of aerosol propellant components have aided the industry greatly with excellent technical service. Propellant 12-propellant 11, propellant 12-propellant 11-methylene chloride, and propellant 12-methylene chloride and propellant "A"(5) (propellant 12-propellant 11-isobutane, patents pending) have been used as the principal propellant agents for non-aqueous single phase aerosol products. For aqueous systems and especially non-food foam products, propellant 12-propellant 114 mixtures have been used because of their greater freedom from hydrolysis troubles. For pressurized food products, CO_2 and 85/15 volume % ratio N_2O-CO_2 mixtures have been employed. Butane, propane and propellant 12-propellant 114 and propellant 101 have been used for certain two phase systems. Mixed gas and liquefied gas systems have been under study for some time.

The future trend in aerosol propellants is not hard to discern. Research activity will continue along the roads first explored over 10 years ago and the side paths opened up since then. The pattern of this work follows fundamental precepts, well appreciated by those who have experience in this industry. Valve, container, propellant and formulation constitute a complex entity, all parts of which have to be considered carefully in the development of successful products. The development of improved and varied containers, new can linings, of valves which give superior atomizing characteristics, the use of inhibiting agents, emulsifying agents and co-solvents, have increased the possibility of using a wider variety of propellants and of decreasing their cost.

As the aerosol market expands, one finds less reliance on rule of thumb and increasing emphasis on reliable physical, chemical and thermodynamic principles. In work on the formulation-propellant mixtures that are the working stuff this industry sells, more than the early reliance on vapor pressure and liquid density data are now required. Properties such as phase relationships, flammability relations, viscosity, surface tension, internal energy, enthalpy, specific heats and infra red absorption characteristics become diagnostic tools that cut development costs and lead to ideas for new products and new patents.

The movement of pressurized packaging from the field of household and cosmetic products into the field of pharmaceutical, military and food products presents new challenges and opportunities for further propellant development. The importance of cost reduction in creating larger markets is a sufficiently strong incentive to insure the continued interest of management in all phases of aerosol research, particularly that devoted to reducing propellant costs.

It is often valuable to develop the concept of an ideal, which represents the ultimate in perfection that one can expect to approach, but perhaps not reach. Thus we have the ideal gas, the Carnot work cycle and the ideal girl. These are useful as a standard against which to measure degree of achievement. In the maze of aerosol development we have found the concept of the minimum cost package most useful. It is realized that the minimum will vary with product type but the idea is still helpful.

Do we now have enough information to estimate with reasonable accuracy the minimum cost valve, minimum cost container, minimum cost propellant and the minimum cost basic formulation type that will give acceptable performance; some standard to tell us how far aerosols have yet to travel along the road of cost reduction? We believe we do. The signs indicate there is plenty of road ahead, and we're sure all firms concerned with aerosols will find the trip interesting, full of headaches, but profitable.

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Aerosol Valves

By S. Jack Campbell
Continental Filling Corp.
Danville, Ill.

TEN years ago, aerosols, then in their infancy, were afflicted with numerous difficult problems. In this respect, the inexperienced formulators and fillers were perhaps fortunate, in fact, for all practical purposes, there was available only one aerosol valve of a fixed design. This valve was attached to the can, and the variations available in the construction of the valve were few, if any. At the present time, there are more than 2,000 functional variations available. Ten years ago, anything approaching this number of functional variations in an aerosol valve would have added considerable frustration to the work of the embryonic formulator.

During the first years of low pressure aerosols, two or three valve manufacturers were capable of furnishing all of the valve requirements, even though their production was quite small. At the present time, there are between 20 and 24 major and minor aerosol valve manufacturers, supplying valves for approximately 300,000,000 units per year.

After the initial problems of formulation and production were overcome, the aerosol package began to appear in more and more retail stores and the people exposed to this package became more aware of the fact that the potential in this new field was tremendous. Formulating new products into the pressurized package was hindered somewhat by the fact that there were only one or two valves of fixed design available.

In the late 1940's, a few more types of aerosol valves became available. They incorporated a number of improvements in design and flexibility. By the early 1950's, 12 to 15 manufacturers were producing a growing variety of aerosol valves which were necessary to dispense the broadening range of pressure packed products. In the last two years, aerosol valve engineers have effected some far-reaching and even radical changes in valve design. These have made possible the greatly increased variety of products and formulations to which the aerosol principle is applicable.

Valve manufacturers are to be complimented on their many new developments, which enable the formulator to choose the valve for the particular product, rather than, as formerly, the product for the valve.

Lower cost valves have also resulted from improvements in design. Early aerosol valves sold for from eight to 12 cents each. These prices were based on the use of more costly materials and more expensive methods of manufacturing, such as the molding of small intricate parts.

Present valve prices range from 3.3 to five cents. This reduction has been accomplished by simplified design; use of lower price materials, and mass production of valves using fully automatic equipment. Increased competition among valve manufacturers is another factor that has contributed to lowering of prices.

It is difficult to estimate future trends in aerosol valve prices; the consensus is that three cents is about as low as valve prices can go under present economic conditions.

The trend from metal to plastics in the production of aerosol valves has been fairly general. This has lowered prices in two ways: cheaper raw materials and reduced production costs. Unfortunately this transition from metal to plastics has not eliminated the problems of chemical and physical compatibility of valve and formulation. In view of this, testing and control activities have become one of the most important functions of the valve manufacturer. Improved quality control, production control and laboratory testing, as well as better methods of raw materials testing, have evolved from the growth of aerosols.

We have previously indicated that the original low pressure aerosol valves were attached to the can by the container manufacturer. When valve making ceased to be a function of the container manufacturer, aerosol valves were supplied to the filler separately in a one-inch cup. This has been the most popular type valve mounting. Recently other type valves have been developed to meet changes in aerosol containers. Currently available are drawn metal containers, glass bottles, plastic coated glass bottles, and more recently blown and molded plastic bottles. As a result, valve manufacturers have had to adapt their valve mechanisms to the appropriate closure for any of the new types of containers. At the present time, all aerosol valve mechanisms are offered in the common one inch cups, staked in the tops of metal cans, in 20 mm. metal ferrules for glass bottles, molded in the tops of plastic bottles, molded in plastic threaded tops for special plastic bottles, or molded in plastic fitments capable of being spun sealed on plastic bottles. How to attach the valve to the aerosol bottle has always been a problem for the valve designer. With the increasing number of types of aerosol containers the problem has become more complex.

Perhaps an aerosol valve might be defined as, "an apparatus with which to provide a controllable leak in a pressurized container." Actually, this definition, though accurate in principle, does not reveal the many complications involved in obtaining the desired dispensing characteristics.

Interestingly, the original aerosol spray valve included the same double orifice and expansion chamber system as do all of the present day spray valves. Only the methods of obtaining the double orifice and expansion chamber have been altered in the new designs. Valve designers most certainly have improved upon this basic principle, and in recent years modifications have made it possible to adapt an ever-increasing number of new products to the aerosol spray principle. These new modifications include: low delivery rate design, reversed taper orifices, meter spray valves and, probably most important, the mechanical breakup button. This last device has permitted the aerosol formulator to atomize pressurized formulations which have not previously been combined into a homogenous mixture.

Perhaps it is possible to predict that aerosol valves of the future will incorporate new and improved design features. Possibly they will have fewer parts, utilize more inert materials of construction, feature new or improved closures, and be able to function in any position. The number of variations in valve design will grow so that new and different products may be dispensed as aerosols.

Valve manufacturers and particularly their design engineers, are to be complimented on the tremendous progress they have made during the past 10 years. It seems probable that if the present design and development rate continues, valve mechanisms 10 years from now will be completely beyond the vision of our most imaginative designers.

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Auto Wax Testing

(*From Page* 79)

miles, readings were again made on all the test surfaces at Washington University, using the same Geiger counter as before. There still remained a considerable amount of radioactivity on the hood but only in that area which was covered by wax No. 1. There was no remaining radioactivity on any of the other surfaces above the normal background count. The average of the readings at this time on wax No. 1 was approximately 100 counts per minute, sufficiently above the normal background count of about 30 per minute to be conclusive proof of the presence of the original sample.

Conclusions

AS a result of these tests, we have drawn the following conclusions: A semi-quantitative comparison of the initial thickness of wax films can be achieved by this method. The relative length of life or wear of these films can also be measured. The retention of wax films on various types of finishes, and variations from finish to finish can also be measured. The areas of greatest wax film wear on cars can be determined. The appearance of the finish with respect to the amount and type of wax remaining can be checked and judged.

We cannot accurately measure the actual thickness of wax on the surface by this method, mainly because even though we could calculate the amount of radiation emission for a given amount of wax, some of the beta rays are absorbed by the wax film itself, and only those escaping from the surface can be measured directly. Even in our present "semi-quantitative" test data it can be seen that this self-screening factor "loads" the data in the favor of the thinner films. We cannot say how long a wax will last on any car in comparison with any other wax. We can only say how long a wax will last on a given area of a given car in comparison with another wax. We cannot predict the longevity of any wax on all cars because even in this one series of tests we proved that the life of the wax on two different types of finish was of varying duration.

It is generally felt by all those taking part in this testing that only the first step has been accomplished. We feel that for generaly analysis of film thickness and wear, the addition of a foreign material such as cobalt naphthenate is not the only answer. A logical series of further tests would be to label the various ingredients of the film-former, such as wax, resins, and silicones, with radioactive tracers. It could then be determined which elements of the wax film lasted the longest, which type of wax had the greatest resistance to wear, and dirt-retention, and water resistance. There are many possibilities that could be developed further. We feel that this initial effort was successful in opening up a new method of modern testing technique, and it is certainly a valuable aid in new product development.

Military Insecticides

(*From Page* 65)

and other flying insects in inclosed areas.

Resistance

AS you are well aware, resistance of insects to various insecticides is now widespread. An idea of its extent can be gained from the warning issued by the World Health Organization early in 1956 indicating that reports of resistance had been received from 32 nations. Resistance is occurring in many species of both economic and public health importance. To date, the latter is of the greater importance to the military services, and the situation may be briefly summarized as follows:

Houseflies: Resistance to the chlorinated hydrocarbons is encountered nearly everywhere. In some areas, control at military installations can still be obtained with this group of insecticides. Resistance to the organic phosphates has been reported from civilian communities in Denmark and Florida. Organic phosphorus compounds are being used as residual sprays or baits at military installations successfully for the control of flies resistant to the chlorinated hydrocarbons.

Mosquitoes: A number of the important malaria vectors of the world have developed resistance to one or more of the chlorinated hydrocarbons. In the U. S. *Anopheles quadrimaculatus* in Mississippi has been found highly resistant to dieldrin, chlordane, and BHC, but normally susceptible to DDT. This has presumably resulted from exposure to insecticides used in agriculture. To date, no reports of Anopheles resistance have been received from the military services. Resistance to the hydrocarbon insecticides is also becoming rather widespread in the Culicine mosquitoes, and is also developing to the organic phosphates. The military services have encountered resistance to hydrocarbon insecticides in the case of Culicine mosquitoes breeding in rice fields, flood-water and salt-marshes. To date these have been successfully controlled through the use of organic phosphates.

Cockroaches: Roaches, particularly the German roach, resistant to the chlorinated hydrocarbons, have been reported from many military installations in the U. S. Resistance is generally not universal at a particular installation, but is sufficiently widespread to seriously interfere with control. This has given rise to an increasing use of malathion, sodium fluoride and pyrethrum for roach control.

Lice: Resistance of lice to DDT was first reported from Korea in 1951, and has since been reported from several other areas of the world. However, DDT can still be relied upon for control in most areas. The Korean lice are

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still susceptible to lindane. However, recent reports from other areas suggest resistance to lindane may be expected. Pyrethrin and allethrin louse powders are still effective.

Bedbugs: Bedbugs resistant to DDT have been reported from Hawaii, Greece, Italy, Israel, the Belgian Congo, China and the USA. At most military installations, DDT can still be used successfully. Lindane appears to give effective control of the DDT-resistant strains.

From the above, it can be seen that resistance is a very real problem to the military services, as well as to others involved in the control of insects of public health importance. We have developed test methods to be used in determining the occurrence of resistance, and hope to keep abreast of the problem as it arises in the field. The solution to the problem, once solid resistance to the various classes of insecticides has developed, is still not in sight. An obvious immediate measure is to place even greater emphasis upon the elimination of breeding areas and the enforcement of sanitary measures to reduce breeding to a minimum. In the meantime, the military services are supporting an active research program designed to arrive at a better understanding of the factors underlying the development of resistance, with the hope that this will lead to methods for delaying or preventing the development of resistance.

Whitening Agents

(*From Page 44*)

curves of Whiteners 3 and 4 in the ultraviolet region of the spectrum (1). The vertical scales are given both in reflectance and absorptance, where percent absorptance equals 100 minus percent reflectance. The higher the percentage of ultraviolet radiation absorbed, the greater the fluorescence, other things being equal. Now the AH-5 lamp only gives off radiation substantially at 365 millimicrons,

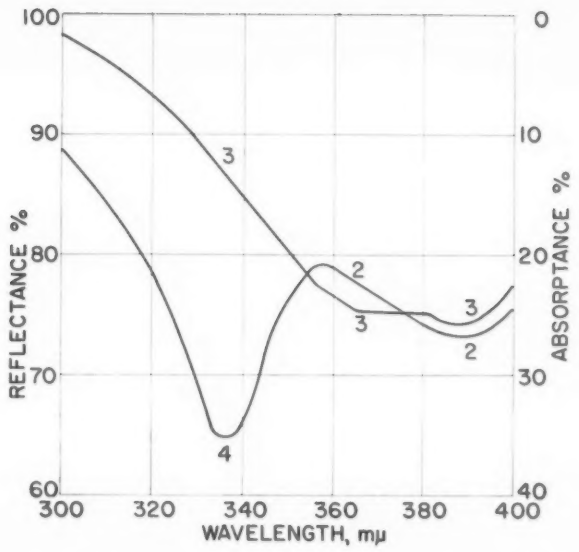

Figure 8. Reflectance curves of two fluorescent whitening agents

as is shown in Figure 7. On the other hand, the T12 lamp gives off radiation both above and below 360 millimicrons. Whereas Whiteners 3 and 4 have close to the same absorptance values at 360 millimicrons and above, Whitener 4 absorbs much more strongly in the region of 340 millimicrons than does Whitener 3. Therefore, Whitener 4 is more favored under the T12 lamp than under the AH-5 lamp, compared with Whitener 3. This simple experiment shows that the distribution of energy in the ultraviolet source is of great importance in judging or measuring fluorescence.

Neither of these lamps has the same ultraviolet energy distribution as daylight. The ultraviolet energy distribution of daylight is also shown in Figure 7 as curve C (2). We can see that if we had a fluorescent whitener which absorbed strongly in the region of 390 millimicrons, where daylight has a quite a bit of energy but both of the lamps have little or no energy, such a whitener would be penalized under the ultraviolet lamp as compared with daylight. It is generally true that even if the problem of finding a viewing device with the correct spectral sensitivity mentioned earlier were solved, misleading results would still be obtained unless the ultraviolet light source duplicated daylight in energy distribution.

Use of Fluorimeter: Fluorimeters are devices commonly used to determine fluorescence of dyeings with fluorescent whitening agents.[1] Quite a few such instruments have been developed, but they are all based on the same principle. Figure 9 shows a block diagram of the fluorimeter which is used at Cyanamid at this time.[2] Radiation from a black light ultraviolet lamp passes through a filter (Corning No. 5860 Violet Ultra filter glass), the function of which is to cut out all visible light and pass only the ultraviolet. This ultraviolet radiation then strikes the sample, giving rise to fluorescent light in the visual region. However, some ultraviolet radiation is reflected by the sample, and this must be removed by another filter before the fluorescence is measured by the photomultiplier tube. The latter filter is a Wratten No. 47A, which cuts out ultraviolet and passes the blue fluorescence. Our particular fluorimeter has a series of range switches which makes it possible

[1]For a list of references to the use of fluorimeter, see Ref. (1).

[2]This is a modification of the G-M fluorimeter, originally developed for determining uranium. The changes comprised the insertion of the filter after the ultraviolet lamp, the substitution of a different filter before the photomultiplier tube, and the use of a new sample drawer adapted for use with cloth samples. Both the original and modified instruments are available from Engineering Equipment Company, P. O. Box 1506, Boynton Beach, Florida.

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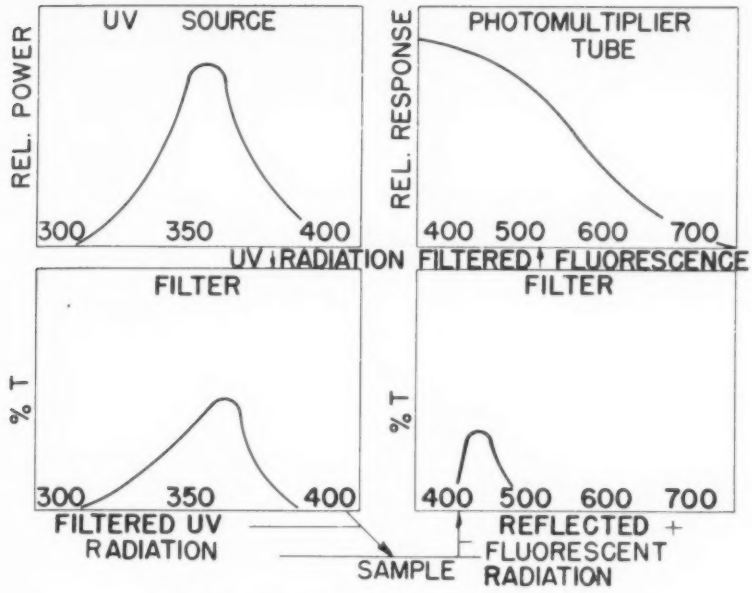


Figure 9. Block diagram of modified GM fluorimeter

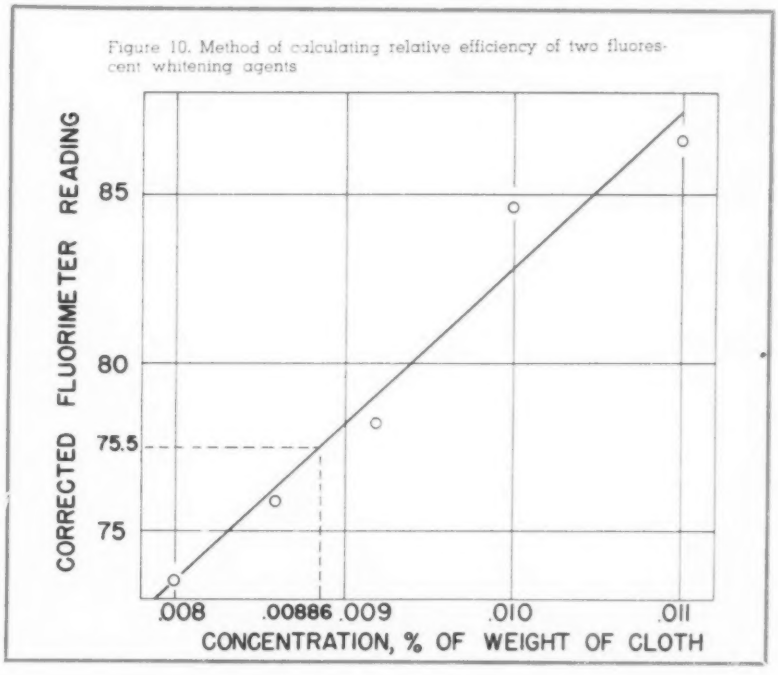
to read any degree of fluorescence from very weak to very strong. Readings are reproducible, and have a high degree of precision.

The fluorimeter provides the most precise method of determining fluorescence; in a series with any one whitener a strength difference of 1.5 percent can easily be detected. This makes the fluorimeter ideally suited to exact studies of the type mentioned above in the section on visual examination under ultraviolet illumination; it is also quite useful for quality control of shipments of fluorescent whitener. However, as in the case of the visual method, it cannot be used directly for comparing two different types of whitener, and exactly for the same reasons. It can be seen from Figure 9 that the energy distribution of the ultraviolet lamp, particularly after modification by the transmission characteristics of the filter, is quite different from that shown for daylight in Figure 7. Furthermore, the response curve of the photomultiplier tube, as modified by the transmission curve of the filter in front of it, is considerably different from the theoretically correct response curve shown in Figure 6. These limitations of the fluorimeter are not always recognized, and misleading results have been obtained when whiteners of different types were compared against each other.

Use of Fluorimeter with Correction Factor: It is possible to apply a correction factor to readings obtained on a fluorimeter so that fluorescent whiteners of different types may be compared against each other (1). This factor is really the product of two separate factors; the first corrects for the discrepancy between the energy distribution of the light source used in the fluorimeter and the energy distribution of ultraviolet radiation in daylight, and the second corrects for the discrepancy between the response curve of the photomultiplier tube plus filter and the theoretically-desired response curve. These factors are different for each pair of whiteners compared, and must be recalculated for each new case. However, once the calculation is made, the factor can be used indefinitely for the same pair of whiteners. The method of calculating these factors is given in the reference cited at the beginning of this paragraph.

After the correction factor for a particular pair of whiteners is calculated, the determination of the relative whitening efficiency of these whiteners is made fairly simply. The method is illustrated in Figure 10. In this particular experiment, a 0.0060 percent dyeing on the weight of the cloth of a particular whitener, which we will designate as Whitener P, was made. This dyeing was read in the fluorimeter, and gave a value of 75.5. A series of dyeings of another whitener, which we will designate as Whitener Q, was made at concen-

Figure 10. Method of calculating relative efficiency of two fluorescent whitening agents



CONVINCING EVIDENCE—A swarm of mosquitoes in this test glass enclosure show no interest in the man's arm above the black line where meta Delphene repellent has been applied, although they feast on his untreated wrist and hand. (USDA Photo)

HOW TO BECOME UNPOPULAR WITH MOSQUITOES

A new and outstanding insect repellent—diethyl-meta-toluamide—developed by the United States Department of Agriculture for the Armed Services, is available in increasing commercial quantities from Hercules Powder Company under the name of meta Delphene.

USDA workers have found the meta isomer of diethyl toluamide to be the most effective repellent of the three isomers tested.

Hercules' background in xylene chemistry, coupled with its understanding of the rigid quality control procedures involved, has made possible the manufacture of a product with unusually high meta content. Meta Delphene (83% minimum meta isomer) is available only in a purified grade suitable for a cosmetic chemical.

This new repellent is highly effective against mosquitoes, chiggers, ticks, fleas, and biting flies. Meta Delphene offers many more characteristics ideal for manufacturers of repellents.

For example, it is odorless and does not rub off easily, providing longer protection than other repellents. It can also be applied directly to most fabrics and can be incorporated in dry-cleaning agents to furnish protection against insects.

Reports from the USDA, after two years of extensive tests, indicate that this new chemical will provide the best protection available against a wide variety of insects.

meta DELPHENE
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Agricultural Chemicals Division, Naval Stores Department
HERCULES POWDER COMPANY
961 Market St., Wilmington 99, Del.

trations ranging from 0.0080 to 0.0110 percent on the weight of the cloth. These were read on the fluorimeter, and the readings were multiplied by the correction factor which converts such readings to the same basis of effective fluorescence as for Whitener P. The corrected readings were plotted against concentration, and the best straight line (by least squares) was drawn through the points, as shown in the figure. It is seen that a 0.00886 percent dyeing of Whitener Q would give the same fluorescence as did the 0.0060 percent dyeing of Whitener P. Therefore, Whitener Q is 0.0060/0.00886 percent as effective as Whitener P; this amounts to a relative efficiency of 68 percent. It should be mentioned that the curve of fluorescence against concentration is not a straight line over a wider concentration range; however, the straight line is the most convenient plot to use over a limited concentration range.

This method has all the advantages of the best methods considered so far. The precision obtainable is, of course, equal to the precision obtained by the use of the fluorimeter without the correction factor. The accuracy approaches that obtained by direct examination in daylight; however, some error may be introduced in the theoretical assumptions made in calculating the correction factors, as well as in the data used for this calculation. In general, this is probably the most satisfactory method available for comparing whiteners of different types for their whitening power.

The disadvantage of this method lies in the specialized apparatus necessary to obtain the data from which the factors are calculated. The data needed are the emission curves of both whiteners, such as those shown in Figure 3; the ultraviolet reflectance curves of both whiteners, such as those shown in Figure 8; the energy distribution curve of the fluorimeter light source and the transmission of the filter in front of it, such as shown in Figure 9; also the response curve of the fluorimeter such as that shown in Figure 5. This requires specialized equipment which is not available in many laboratories. Once the data are obtained, the correction factor may be calculated in one hour.

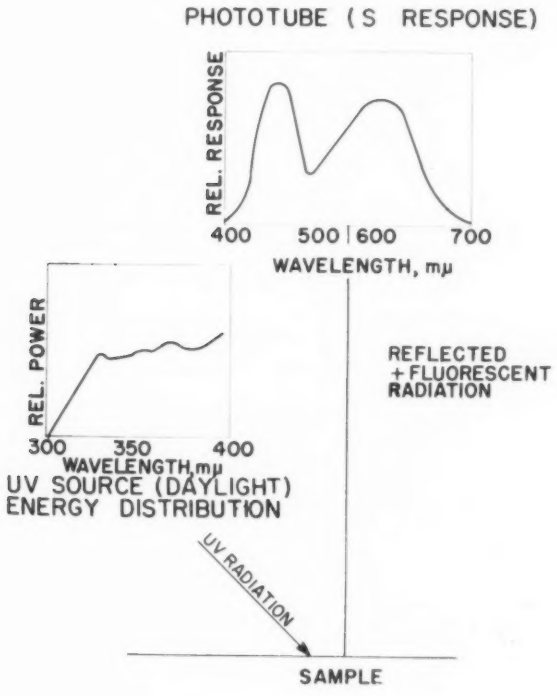

Figure 11. Block diagram of ideal fluorimeter which would not require a correction factor for comparing whiteners of different types.

Use of Specially-Designed Fuorimeter: The ideal way to compare two different fluorescent whitening agents for their whitening power would be to use a fluorimeter which would give direct readings in effective fluorescence, and which would require no calculation. We do not as yet have such an instrument, but plan to build one.

Figure 11 shows a block diagram of an instrument of this type. The light source has an energy distribution identical to that of the ultraviolet component of some standard phase of daylight, and the photosensitive device has a response curve identical to the theoretically-desired one. Such a fluorimeter would combine the accuracy and precision of the best of the presently-available methods, with the further advantage of extreme simplicity. The difficulty would be to find the proper light source and the proper filter-phototube combination.

Alternatively, by using filters which, in combination with the phototube, would give readings of the separate tristimulus values, X, Y, and Z, of the emitted light, the hue as well as the whitening power could be determined. The separate tristimulus values could be easily converted to a quantity representing hue. The sum of the tristimulus values would be a measure of the effective fluorescence intensity or whitening power. This is because the theoretically-desired response curve of the phototube, shown in Figure 6, actually represents the sum of the tristimulus functions $\bar{x} + \bar{y} + \bar{z}$ as was mentioned previously.

(To be Concluded)

References

(1) Eugene Allen. Submitted for publication in the *Journal of the Optical Society of America*.

(2) W. E. K. Middleton, unpublished report to the Inter-Society Color Council Subcommittee for Problem 18, Colorimetry of Fluorescent Materials, dated March 22, 1954. A somewhat smaller reproduction of this curve is given in *J. Opt. Soc. Am. 44*, 797 (1954), curve for energy distribution of an overcast sky over a hypothetical urban area.

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40 Rector Street, New York 6, N. Y.

(3) L. G. Glasser and D. J. Troy, *J. Opt. Soc. Am. 42*, 657 (1952).

★

Monsanto Price Rise

The inorganic chemicals division of Monsanto Chemical Co., St. Louis recently announced price increases, effective July 1, of 25 cents per hundredweight on sodium acid pyrophosphate in carload lots and 50 cents per hundredweight in less than carload lots. The increases apply to "SAAP 28," "SAAP 40," and "SAAP-43."

The price rise brings the cost of 100-pound bags of sodium acid pyrophosphate to $11.10 in carload lots and $12.10 in less than carload shipments. Increases in the cost of soda ash and phosphorus, as well as higher freight costs, made the price change necessary, Monsanto said.

★

New Bithionol Source

Bithionol, a germicidal additive for soaps, detergents, shampoos, etc., is now available from an additional source. Catalin Corporation of America, New York, announced recently that it is making the material in commercial quantities and is offering it as a bacteriostat for incorporation in soap, shampoos, detergents, shave cream, cosmetics, and other specialties. Catalin's trade name is bacteriostat "CS-1."

In addition to bithionol, Catalin also is a producer of antioxidants, oil additives, alkylation products and other special chemicals.

Bithionol is the generic term for 2,2'-thiobis (4,6-dichlorophenol). Some of the useful characteristics of this compound were known and described in the Thirties. Its practical potentials as a skin degerming agent were not developed and exploited until 1953. The material is made and sold by Monsanto Chemical Co. under the trade name "Actamer."

"CS-1" comes in 200 pound fiber drums, costs $1.35 per pound in quantities of 30,000 pounds or more; $1.40 a pound in quantities of 2,000 pounds or more; and $1.50 in smaller lots. Said to have good stability characteristics, "CS-1" can be stored in the shipping containers for extended periods. Catalin says that it is currently selling its bacteriostat to soap and detergent manufacturers.

Paste Wax Testing

(*From Page* 67)

Candelilla wax
- Acid no. 15-25
- Ash content 0.5% max.
- Melting point 158-167°F.
- Saponification no. 45.0-65.0
- Unsaponifiable content 65.0-67.0%

Gersthofen "OP" wax
- Melting point 214-223°F.
- Acid no. 10-15
- Saponification no. 110-125
- Unsaponifiables 7-10%

520 Sugar cane wax
- Acid no. 28-34
- Color, N.P.A. 8 max.
- Oil content 5.0% max.
- Acetyl no. 35-50
- Ash content 0.25% max.
- Iodine value 9-12
- Melting point 167-176°F.
- Needle penetration 2 max.
- Resin content 0.5% max.
- Saponification no. 75-95
- Suspended matter 0.1% max.

Fully refined paraffin 132/134
- Color, Saybolt molten + 25 min.
- Melting point 132-134°F.
- Oil content 0.5% max.

Special refined paraffin 150/155
- Color, Saybolt molten + 25 min.
- Melting point 150-155°F.
- Oil content 0.5% max.
- Needle penetration 8-15
- Viscosity, SSU at 210°F. 40-45"

Stoddard solvent
- Aniline point 129-147°F.
- Saybolt color + 25 min.
- Distillation range 300-410°F.

The accompanying data compares shock resistance by the method described above, with such things as cone penetration and solvent separation, the latter at 100°F.

It is evident from study of these data that neither cone penetration nor solvent separation are adequate guides to the ability of a paste wax to withstand shocks.

If we take an angle of 40° drop at a temperature of 100°F. as representing a minimum level of shock resistance for a paste, we can make some interesting conclusions. For example:

Mixture A would require, under these circumstances, a non-volatile content of 25.5 per cent yielding a penetration of 130 (by interpolation).

Mixture B, would only require 21 per cent non-volatile yielding a cone penetration of 119.

With Mixture D, a non-volatile of 30 per cent failed to pass a 40° drop on the Shock Tester at 100°F., in spite of the fact that the cone penetration was 81.

Other similar comparisons can be made but it is evident that cone penetration at room temperature is not an accurate measure of how much shock a paste wax will withstand.

Another interesting generalization one can make is that solvent separation at 100°F. is not a true indication of the ability of a paste to withstand normal shocks in handling. For example, Mixture B showed slight solvent separation (27 per cent non-volatile) at 100°F. yet withstood an impact of 90°. Mixture E at 27 per cent non-volatile showed excessive solvent separation at 100°F., yet passed a 40° impact. Other examples of this are evident from the data.

In short, a mechanism has been found which gives a quantitative result in judging shock resistance of paste waxes.

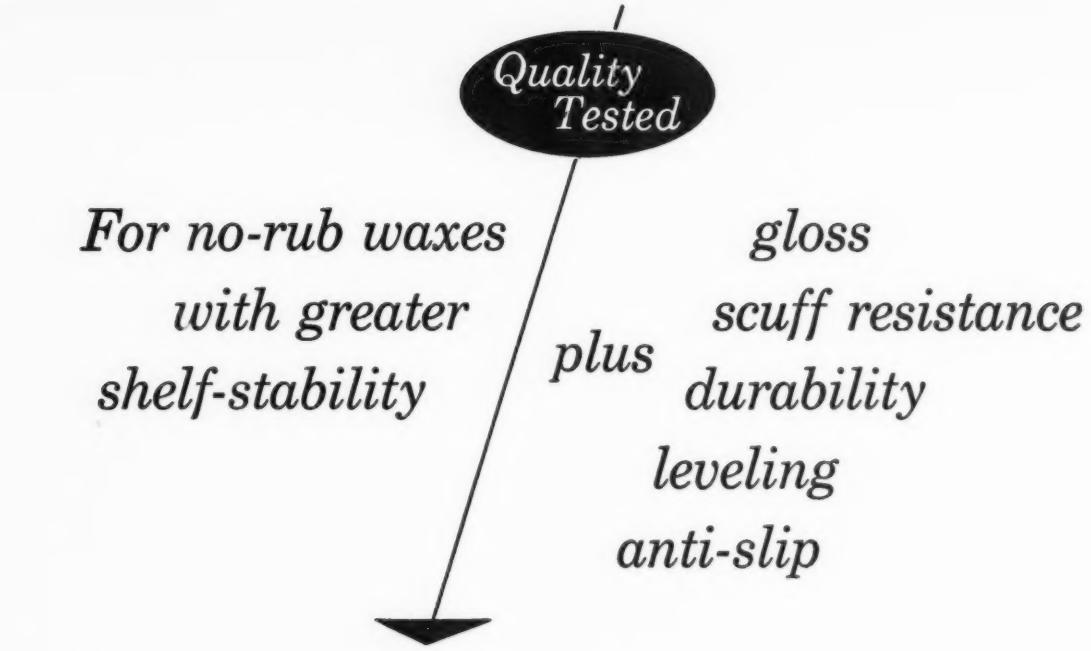
Letters

(*From Page* 33)

ical Specialties there is reference to a cationic softening agent marketed by our company under the trade mark "Sapamine." In a footnote you mention that this is a registered mark of CIBA Co., Summit, N. J.

We appreciate the mention of our product in this article but we would like to point out that CIBA Co., Inc., is a New York concern with its principal offices at 627 Greenwich St. CIBA Pharmaceutical Products, Inc., a sister company dealing exclusively with pharmaceuticals, is located in Summit, N. J.

We hope that you will not object to this correction and we wish to compliment you on your



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A. L. Perrin
Assistant to the executive vice-president
CIBA Co., Inc.
New York 14.

News—from Down Under

Editor:

Thank you very much for your letter of April 27th regarding the AOCS Short Course.

We did change our company name from Union Oil, Soap & Candle Co., Ltd. to Taniwha Products, Ltd., last December, in order to identify the company more closely with the trademark of our major products.

We might say in passing, that we have held the trademark for "Taniwha" soap since the 1880's and that our company's name appeared very early in the register of the New Zealand Trademarks and Patents Office.

The old "Taniwha" is a Maori word depicting the name of a mythical being who was reputed to dwell in deep water and caves. We, however, have assumed that this being was not as fearsome as had been thought and have adopted as an identification mark a rather attractive mermaid which we think more adequately represents present-day thinking than the old "Taniwha."

This company was constituted as a public company in 1882 and its shares have been traded on stock exchanges in New Zealand since that date. Our shareholders number 293 and are made up from 52 estates, trusts and companies, 130 women and 111 men. We daresay that this follows along the lines of all old established companies in many countries. Only once since the inception of the company has a profit not been made and in every year a dividend has been paid to the shareholders.

We are currently producing about 16 per cent of the soap and about nine per cent of soap powder sold in New Zealand and our candle sales are in the region of 35 per cent of total New Zealand sales. Our range of production comprises domestic bar soap, toilet soaps and soap powders, domestic laundry starches—rice and plastic based—abrasive soaps, candles, the formulation of synthetic detergents for domestic use, and aerosols.

We have quite a large plant, by New Zealand standards, and we are modernizing as rapidly as finances permit. In line with our plans, we are installing a "Mazzoni" soap drying unit for production of domestic laundry tablet soap and toilet soaps.

L. A. Williams, Mgr.
Taniwha Products, Ltd.
Auckland, New Zealand

Mr. Williams' letter is in reply to an earlier one of ours in which we inquired about the new company name. His reply is so interesting that we thought our readers might like to see it.—Ed.

—★—

Tennessee Clarification

Editor:

In the May issue of *Soap & Chemical Specialties* on page 221, you published a news item under the heading, "New Surface Active Agents." The chemicals mentioned in this item currently are in the development stage, and as such are being handled by our recently organized Marketing Research and Development Department. It is this group which moved on June 1 to a new location at 1330 West Peachtree St., suite 500, Atlanta 9.

Lest there be some confusion concerning the location of our sales headquarters, please note that these will continue to be located in the Grant Building. Our mail address is still P. O. Box 2205, Atlanta 1, Ga.

Frank C. Calkin,
Manager of Sales,
Organic Chemicals Division,
Tennessee Corp.
Atlanta, Ga.

In our news item we mentioned that three new surface active agents had been introduced by Tennessee Corp., 805 Peachtree Building, Atlanta. Later on in the same item we said, "At the same time, it was also announced that Tennessee Corp. will move on June 1 to a new location at 1330 West Peachtree St., suite 500, Atlanta 9." We believe Mr. Calkin's letter clarifies the matter, and thank him for straightening us out.—Ed.

—★—

Packaging Bleach

Editor:

As a subscriber to *Soap & Chemical Specialties*, we are writing to seek advice from any of your readers who would be in a position to help us in handling of sodium hypochlorite solution.

It is our intention to dilute a 12½ per cent solution of sodium hypochlorite to five per cent and then, by means of vacuum, fill this product into a retail package for use as a household bleach. At this stage, it is planned to use a fibrocement tank for diluting and mixing. The mixing will be done with a stainless steel paddle. All parts of the filling machine to come in contact with the solution will be manufactured of either plastic tubing or ebonite.

We have two types of closure designs in mind for the package. One would allow 10 per cent air space for expansion of gases, while the other would consist of a plastic cap with a small drilled hole and a latex wad, which would permit "breathing of gases" if submitted to conditions which would cause internal pressure.

However, we would like to know if our plans are correct. Could other metals or materials be used for tanks in which to dilute the solution? Is there another material from which the vacuum filling machine could be made? Also, our closure is intended to fit into an amber glass bottle of 16 fluid ounces. Which of our intentions would be the better or are there more improved ideas?

R. F. Wellstead
Sanitizing Division Mgr.
W. K. Burnside Pty., Ltd.
Melbourne, Australia

We throw this open to our readers; any ideas?—Ed.

NEW research confirms CHLORDANE'S stability!

"Nineteen-year test" proves CHLORDANE is stable in alkaline soils!

THE FACTS ABOUT ALKALI STABILITY!—Soils in many areas are highly alkaline, and the "fill" around new homes often contains plaster scraps and other alkaline materials. Any insecticide adversely affected by alkalinity would, in many areas, quickly lose its effectiveness. Chlordane's alkali stability was established at the time of its introduction, ten years ago, and is one reason why Chlordane is so widely recommended and used. A test recently conducted in Velsicol's research laboratories brings out more vividly the extent of Chlordane's stability.

CHLORDANE MAINTAINS STABILITY 19 YEARS! Test conditions were established which duplicated nineteen years of actual contact with highly alkaline soil. Chlordane was mixed with calcium carbonate, a compound with a high alkalinity rating. Soil with a similar alkali rating would not support vegetation. This mixture, together with a sample of Chlordane without calcium carbonate, was heated to a temperature that accelerated the reaction to thirty-eight times what it would be at normal soil temperatures, and held at this high temperature for six months. The result: at the end of the test—a simulated 19 year period—The Chlordane with highly alkaline calcium carbonate was still the same strength as the Chlordane without the calcium.

CHLORDANE PROVEN EFFECTIVE IN ACTUAL USE FOR TEN YEARS! The effectiveness of Chlordane has been proven by the results of actual field use over a period of more than ten years. No other insecticide is backed by such a wealth of data proving effectiveness and safety. No wonder Chlordane is preferred by home owners and professionals alike!

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"Jet Blaze," a new charcoal lighter fluid being distributed by Crescent Chemical Co., Ardmore, Pa., is now being loaded by Peterson Filling & Packaging Co., Danville, Ill. Novel feature of the product is the use of a hydrocarbon gas instead of conventional type propellants. American and Continental are supplying the cans and foam valve is by Clayton Corp., St. Louis.

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COMPLETE PACKAGING APPROACH

The Right Closure

Know-how as to the best available liner and closure—best for packing, displaying, or using a specific product—may well be one of the most important single points through which expert packaging counsel will reward you many times over.

Needed Fitments

With emphasis on the word "needed," Owens-Illinois specialists are keenly aware of sales benefits possible through use of plastic shaker and pour-out fitments which are not "gadgets" but which increase consumer satisfaction with your product.

Merchandising Cartons

Modern cartons are developed only through systematic consideration of their opportunity to serve you in the retail store and retail warehouse as well as on your own filling line and in transit. Owens-Illinois is pioneering such developments.

you can ride to greater sales . . .

with an Owens-Illinois package that sells through convenience in use

It's a well known fact that in addition to a good product one secret to greater sales is a well designed and engineered glass package.

Glass does more than let customers see what the product looks like. It adds a sparkle and eye-catching appeal to packages displayed in the store. An attractive, easily recognized package means more repeat sales, too.

In addition, a glass package protects the contents, shows the supply available and maintains good quality throughout many openings and closings. There's no waste or spoilage, either. A distinctively designed glass package can give your advertising campaign a tremendous boost.

Market-minded designers at Owens-Illinois will help you plan a well styled glass container with a powerful merchandising appeal all of its own. Owens-Illinois can provide glass containers of all types, capacities and designs.

DURAGLAS CONTAINERS
AN (I) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

10 PRODUCTS...

with varied dispensing requirements

ALL SERVED BY ONE VALVE!

- Nos. 1, 2, 4 and 5 use dispenser fitments requiring no overcaps. Have OEL patented halfturn lock and unlock operating button, suitable for shaving creams, hand lotions, shampoos, coarse plant sprays, fire extinguishers, etc. Available also with greater flow for "fluffing" effect.
- Nos. 7, 8 and 10 feature cosmetic type dispenser button for glass, plastic and metal containers. Available for very fine, standard and three-phase dispensing: cosmetics, hair sprays, powders, etc.
- Nos. 3, 6 and 9 have standard dispenser button using protective overcap. Available for standard insecticides, room fresheners, products needing fine volume, heavy or wet discharges, such as paints, garden sprays and powders. Non-clogging, always dependable.
- For three-phase packages; provides mechanical particle break-up. Highly efficient on containers of water-based products and on packages using small amounts of propellent for maintained spray pressure.

"500" SERIES

Any product, any application, the O E L "500" Series will satisfy your requirements with one standard valve.

This valve is simple and more dependable because of advanced engineering. It has these advantages:

(1) Designed for pressure or cold filling; can be loaded faster, more economically, with less propellent loss during pressure filling, than any other valve.

(2) Greater safety when using inflammable materials.

(3) More aesthetic appearance — with excellent dispensing control.

(4) Standard, regularly stocked dispenser fitments provide any desired result. Unlimited design opportunity for custom use.

REMEMBER — The O E L "500" will solve your dispensing problem with one valve. Your packaging will have added distinction with O E L's exclusive custom appearance.

Write for complete information TODAY!

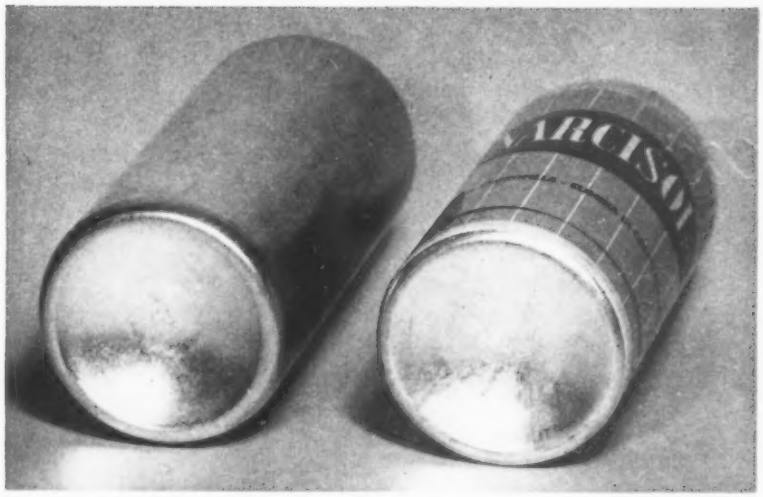
O E L THE *BETTER* AEROSOL VALVE

OIL EQUIPMENT LABORATORIES, INC.

600 PEARL STREET
ELIZABETH, NEW JERSEY

Aluminum Aerosol Containers

By Aksel Taranger*
Aluminum Union, Ltd.
Montreal, Canada



Internally domed base of a one-piece, or monobloc, aluminum can of Italian manufacture.

AEROSOLS in Europe are much newer than in the United States, and consequently the field is still very small. How much smaller can be seen from Table I, which lists 1956 consumption of containers for pressure packaging. These figures, while not true aerosol production or sales figures, do give some idea of aerosol output and sales in those European countries where pressure packed products are of some significance.

There are many aerosol fillers in the U. S. who annually use a greater number of containers than all of Europe.

We in Europe are impressed by the rapid expansion in the total U. S. consumption of containers. We are encouraged by the fact that we have a greater population in Western Europe than that of the U.S.A., and hence, the aerosol trade should expand in our part of the world also, although at different rates in different countries. We feel that for aerosols the most difficult period is past. We had to learn the technique of making containers in tinplate, aluminum, glass and plastics. The markets had to be tested for products and container types. Propellants had to be made available at reasonable prices, loaders had to be established, the buying public educated, and, last but not least, the public in each country had to be told, in their own language, to forget old habits and loosen the purse strings. We may eventually have a common Western European market but we are not there yet.

However, the consolidation period is largely over and Europe can make containers, propellants, valves and a variety of products suitable for aerosol dispensing. Contract fillers have been established. In addition, American products are filled in Europe, particularly insecticides, sun tan sprays, shaving creams and hair lacquers. We are happy to see you gain this business, because after all you pioneered in this field.

Aluminum Aerosols

PERHAPS the only original contribution to the aerosol industry which Europe can claim is that of the aluminum container, particularly the single-piece or monobloc type. The honor really belongs to the Italians, who developed the aluminum single-piece container in 1952. By single-piece or monobloc, I mean a container with an integral bottom, a design advantage which is shared by no other metal can.

Of course, aluminum is not limited to the manufacture of the single-piece type. Another type with a seamed-on bottom, i.e. a two-piece container, is used more extensively. The latter is similar in design to Crown cans. Aluminum is never used for tinplate-type containers. First of all, economics is against using aluminum sheets for body maker manufacture but the main problem is that of producing a cemented side seam capable of resisting the internal pressures.

We have seen by your I.C.C. regulations for aerosol dispensers, that aluminum and tinplate containers may only be used for pressures of 40 p.s.i. and below. A Swiss firm of repute guarantees its two-piece aluminum containers for 12 atm. pressure or 170 p.s.i. — four times the pressure. In Sweden, the authorities responsible for pressure vessel approval took a single-piece aerosol of Italian make, filled it

Nearly 30 per cent of all European aerosols are packed in aluminum cans. Resistance to corrosion; novel container shapes features.

* A paper presented during the 43rd midyear meeting of the Chemical Specialties Manufacturers Assn., Chicago, May 21, 1957. Mr. Taranger is head of aluminum packaging and development of Aluminum Union, Ltd., which is a subsidiary of Aluminum, Ltd.

glass containers move more chemical specialties

Use **Anchorglass**® *containers sealed with* Anchor® *caps*

THERE'S good reason why glass containers move more household chemicals. Being chemically inert, they don't affect the contents—purity and potency are fully protected. They won't rust or corrode—inside or outside. They're easy and safe to open . . . reseal tightly to protect unused contents. And a glance reveals how much is left in the glass container, warns when it's time to reorder. Pack and move more chemical specialties in glass . . . in Anchorglass containers, sealed with efficient, dependable Anchor metal or molded closures.

ANCHOR HOCKING

GLASS CORPORATION

Lancaster, Ohio

Table I. 1956 Consumption of Aerosol Containers in Europe

	Range	% Aluminum containers
Austria	80,000 to 100,000	20
Belgium	1,000,000 to 1,200,000	20
Denmark	250,000 to 300,000	10
Finland	500,000 to 600,000	30
Germany	6,000,000 to 7,000,000	27
Holland	2,000,000 to 2,500,000	10
Italy	6,500,000 to 7,000,000	100
Norway	600,000 to 700,000	10
Portugal	50,000 to 70,000	10
Sweden	1,000,000 to 1,250,000	20
Switzerland	700,000 to 750,000	70
United Kingdom	9,500,000 to 10,000,000	15
Grand total	27,000,000 to 31,500,000	
Total aluminum	10,500,000 to 12,000,000	38

with product and propellant, stuck it in cooker and heated the water to boiling. The container was perfectly tight. They then transferred it to an oil bath and continued the process until they reached 130° C. or 267° F. The container burst and the metal disappeared completely. Neither filtration or chemical analysis could find a trace of it. It had disintegrated into molecule parts, but not before it reached 267° F., which should suffice. We see no reason, therefore, why aluminum containers may not be permitted for aerosols with internal pressures up to 90 p.s.i. This point is, no doubt, being looked into by the aluminum can industry in U.S.A., which is about to enter the aerosol container market.

There are five things to be considered in choosing a container:

(a) Strength against internal pressure and in transport
(b) Material of construction
(c) Size
(d) Price of container
(e) Aesthetics or sales appeal.

As to strength, I have already mentioned that a well made container of aluminum can easily resist an internal pressure of 90 p.s.i., which is the upper limit called for. Strength in transport is a consideration as the container must not leak due to rough handling. By suitable choice of wall and bottom dimensions and correct design of the joint between wall and domed bottom, the aluminum container will meet all requirements when packed in suitable outer cartons using vertical dividers. Aluminum is more prone to denting than steel or tinplate containers; hence, the use of vertical dividers. The material used is 99.5 percent aluminum in form of slugs from which the can is formed by impact extrusion.

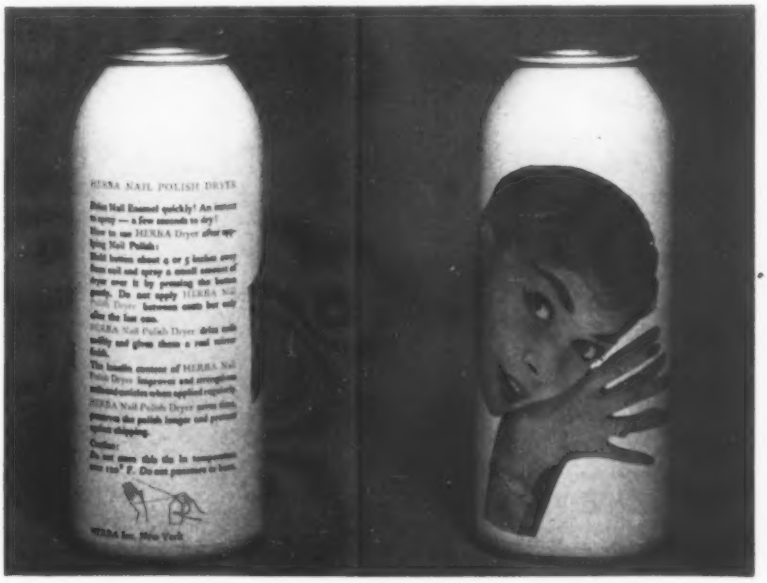
The containers come in all sizes from three to 18 ounce and later on we shall examine sizes and shapes as used in the various countries. As to prices of aluminum containers, they are above tinplate containers but should be of the same order as for drawn steel containers in U.S.A. At least this is true for Italian export prices. A two ounce aluminum container made in U.S.A. is reported to be priced at 3.5 cents an ounce or seven cents. In Italy, you may buy a six ounce aluminum container for 6.25 cents and for export the price is 4.0 cents each. Compare this with a U.S.A. price of 3.18 cents for a six ounce tinplate container.

In Europe, a great deal of development effort has been concentrated on reducing the cost of converting aluminum ingot to slugs for impact extrusion. The Italians, in particular, have been ingenious in devising new methods for such conversion. In Germany, the extrusion process is used by one manufacturer which, due to local conditions, results in low primary material costs. The Italian technique has now been adopted by Swiss, English and American can producers. In the U.S.A., there are processes available which should be equally efficient in lowering conversion costs to a minimum.

Aerosol Can Prices

IN Europe, aerosol can prices vary from country to country. This is due to many reasons, one being that aluminum ingot prices are not the same throughout the territory. The main reason is the relative levels of efficiency in tinplate and aluminum can-making in the different countries. England, France, Germany, Sweden, Denmark and Holland have tinplate can-making industries, which technically compare well with that of U.S.A. All

Lithographed aluminum aerosol container of Herba, Inc., New York, for its nail polish dryer. Unusual container design made possible by one-piece can.



ONLY Continental GIVES YOU AN EXCLUSIVE LINE OF SIX DOME-TOPPED AEROSOLS

WITH SALES OF AEROSOLS expected to hit 600,000,000 by 1960 (about twice 1956 production), you can see the immediate expansion that lies ahead for every aerosol user. Of all suppliers, Continental is best equipped to meet your growing demands, for two reasons. First, Continental offers the most complete line of aerosol sizes. Second, Continental has greatly increased aerosol production facilities. We're ready to deliver all the aerosols you need, any size, any time, anywhere, from plants across the U.S.

Whatever your product—insecticide or shaving cream, air freshener or hair lacquer—Continental aerosols are tailor-made for you, lithographed with your design by Continental craftsmen. Engineering and research services are also available, as well as introductions to valve suppliers and commercial fillers. You can fill all your container needs *with one order* to save on shipping and handling costs.

QUALITY Continental SERVICE

CONTINENTAL CAN COMPANY

Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4

Cash in on the huge demand for AEROSOLS... call Continental TODAY!

these countries, except Sweden, have an indigenous tinplate industry equipped with modern high-speed hot and cold reducing mills and plants for hot dip and electrolytic tin coatings. The aluminum industry for wrought products, i.e. the rolling mills, are mostly small and dependent on job lot orders, which does not tend towards low prices.

The aluminum can-making industries have in part solved the problem of cost of primary materials by using their own specialized processes of fabrication, and have also been ingenious in devising efficient methods to reduce labor costs in can manufacture. However, the volume of aluminum cans made in all of Europe hardly exceeds 250 million cans per annum. The whole aluminum can-making industry is still in its embryonic stage; but is bursting with life.

Volume production will bring prices down and hence bring about a full realization of the material's many advantages for can-making.

Protective Coatings

ALUMINUM containers may be protected against attack from the active product and/or the propellant used in one of two ways. The one most used is that of coating the interior with a suitable lacquer. Mostly, Araldite-based lacquers are used. One or two coatings normally suffice but for sun tan sprays four coatings have been used. The process is somewhat expensive, particularly when the single-piece can with a "necked-in" throat is used. Coating machinery and techniques have been quite easily adapted for aerosol containers from those used in the collapsible tube industry. For most products, aluminum without protection is sufficiently corrosion resistant. Suitable inhibitors are also available.

The second method of protection is that of strengthening the natural aluminum oxide coat of the containers in an anodizing bath. This method is used by a prominent Swiss aluminum can maker, who has introduced the technique to France, Italy and Holland. Besides providing a highly resistant aluminum oxide coating, the process—in the same bath—removes all traces of lubricant from the inner and outer can surfaces. When lacquer coatings are used, the removal of lubricant must take place in a separate operation prior to the application of lacquer. An aluminum surface must be free from lubricant to provide a good surface for lacquer adhesion.

As far as we know, anodized containers can withstand attacks from all commercial products and propellants at present being used in Europe. A layer of four to six microns of oxide is sufficient.

(Concluded next month)

In the final installment, Mr. Tavanger gives country-by-country figures for those countries in Europe which are the leading aerosol producers.

Aluminum containers, whether impact extruded or drawn in a press may, in an additional operation, have their walls bulged, fluted, ribbed or formed to suit individual artistic conceptions. While aluminum shares this property with glass and plastic containers, only aluminum combines a high degree of strength with a forming property.

Various sizes of a few typical European aluminum aerosol containers are shown at right.

"What are we doing about uniform quality and prompt delivery of steel containers?"

"We're getting high quality from J&L ... and they have a plant near every one of ours."

- J&L steel containers provide engineered packaging for dependable transportation and safe storage.
- J&L specialists, backed up by modern research, are ready to consult on your toughest packaging problems.
- Precise fabrication and correct specification of fittings and closures.
- Prompt dependable delivery from nine plants.
- J&L, an integrated steel producer, controls container quality from start to finish.

Call your nearest J&L Container Division office for recommendations on your packaging problems. Or write direct to the Container Division, 405 Lexington Avenue, New York 17, N.Y.

J&L STEEL

Jones & Laughlin

... a great name in steel

Packaging NOTES

Stuart Crown Sales Head

Appointment of Edward P. Stuart as sales manager of the Can Division of Crown Cork & Seal,

E. P. Stuart

Inc., Philadelphia, was announced last month by John L. Carnie, division general manager. Mr. Stuart has been in sales and manufacturing activities for the past 25 years, and since 1955 has been engaged in sales management work.

The division also announced the appointments of Robert J. Siebert and Fred Pinkerton as sales managers of the eastern and Orlando, Fla. districts, respectively. John C. McEver was appointed as sales representative in northern and central Florida. Mr. Siebert formerly was manager of the northeast region, while Mr. Pinkerton previously served as assistant manager of the division's Orlando office.

★

New Container Catalog

A new 16-page, multi-color catalog describing its complete line of containers, was issued recently by Continental-Diamond Fibre Corp., Newark, Del. Entitled "CDF Materials Handling Containers," the brochure describes in detail the company's vulcanized fibre trucks, trays, boxes, baskets, seamless roving cans and barrels. Information is also provided on uses, sizes, colors and features of each item presented in the catalog. Copies of the brochure may be obtained from the company.

★

Western Filling Relocates

Western Filling Corp., Los Angeles, has moved its offices and manufacturing facilities to a new plant at 6423 Bandini Blvd., in that city, it was announced July 1. According to John L. Marana, president, the new building is equipped with five aerosol filling lines with production capacities of about 100,000 units per shift.

★

PI Technical Sessions

Packaging Institute, Inc., New York, recently announced that it will conduct technical and educational sessions, in addition to its annual forum, at the 20th annual Packaging & Materials Exposition to be held in Atlantic City, N. J., Mar. 25-28. The technical sessions are scheduled for Convention Hall on Mar. 24 and 25.

★

New Kiwi Code Dater

A new automatic code dating machine for use on shipping cases and cartons, was introduced recently by Kiwi Coders Corp., Chicago. The unit features type built-in on bands and produces either registered of continuous imprints. Code is changed by turning small wheels on side of machine. Power driven automatic case printers for printing flat cases are also available, according to the announcement.

★

Brockway Names Beltz

Appointment of A. G. Beltz as general sales manager of Brockway Glass Co., Brockway, Pa., was

A. G. Beltz

announced recently by G. A. Mengle, president. Mr. Beltz succeeds James A. Giddings, who recently was transferred to the New York sales office.

★

Palmer J&L Rep.

Palmer Supplies Co., Cincinnati, has been named container sales representative for Jones & Laughlin Steel Corp., Pittsburgh. Palmer will handle J&L's complete line of steel drums and shipping pails for packaging soaps, detergents, industrial chemicals and related specialties.

What's New?

"Lan-O-5" by Independence Chemical Co., Philadelphia, a new corn meal scrubber type powdered heavy duty hand cleaner contains vegetable oil soap plus five per cent anhydrous lanolin. Comes in five pound cartons, shown here, and in 25 to 250 pound drums. "Bora-Soap" powdered hand cleaner, formulated from granulated borax and white coco-tallow toilet soap, packaged in five pound cartons and 25 to 300 pound fiber drums.

New "Lani Lynne" bubbling bath oil by Lani Laboratories, Seagoville, Tex., sells in three fragrances: pine needle, apple blossom, and bouquet. Round 16-ounce bottles by Owens-Illinois Glass Co., Toledo, feature gold sprayed plastic closures; ceramic labels fused right onto bottle resist light, rub off, water, and other liquids.

Colonial Stores, Inc., Atlanta, Ga., introduced its new general purpose detergent "3-D" in a carton of novel design by Jim Nash. Main body of package is sky blue, numeral "3" in white, capital "D" in light green, characters at bottom cardinal red, the last line black. The private label product sells in a giant size (47 ounces) and a large size (19 ounces) package.

"Enden" dandruff treatment shampoo by Helene Curtis now sells in liquid form, packaged in nine-ounce easy grip plastic bottle, for $1.50, tax free.

Uhu Products Corp., New York, distributes "Uhu-Line," said to be first household fabric sizer on U.S. market. Product sells in collapsible tubes at 89 cents each; one treatment said to last several washings.

"Dreft" by Procter & Gamble Co., Cincinnati, first American synthetic household detergent, has joined the liquids. New liquid green "Dreft" is packaged in easy grip glass bottle featuring white plastic cap and a green-on-gold foil label.

Lentheric, New York, offers "Tweed" Mist aerosol toilet water combined with purse size "Tweed" perfume in cylindrical acetate package, capped by golden disc holding gold looped cord. Both for $2.25, price of Mist alone.

White, green and red "Bracon" squeeze polyethylene tube holds eight ounces of "Texaco" outboard gear oil and grease. Tube by Bradley Container Corp., Maynard, Mass., features inner coating.

"Dr. West's" denture cleanser by Weco Products Co., Chicago, now comes in Owens-Illinois Glass Co. four ounce bottle with molded cap and ceramic label.

Bracon . . . SQUEEZE-TO-USE PACKAGING

CONVENIENCE PACKAGING . . . *captures a market!*

Now in their second gardening season . . . BRACON squeeze-cans have become a standard for packaging garden insecticides. Why? Because consumers find them easier to use, more reliable, compact . . . producers realize they cost less, add prestige and beauty to their line.

BRACON squeeze-cans are pliable polyethylene cylinders with metal tops and bottoms . . . permanent multi-color printing. They're stackable . . . often they're refillable. Always lightweight . . . non-breakable and completely functional.

For example, these garden dust containers work equally well when aimed up or down. Simply squeeze . . . WHOOF, a cloud of dust envelopes leaves and petals. Other squeeze-cans are designed for controlled dispensing of syrups, sauces, liquid detergents, tire cleaners, air fresheners, etc.

Over 400 food, drug, cosmetic and household products are being packed in BRACON plastic tubes, bottles and cans.

Build your merchandising efforts with squeeze-to-use packaging!

BRADLEY CONTAINER CORPORATION

A SUBSIDIARY OF AMERICAN CAN COMPANY

Maynard, Mass. — *New York, Chicago, Los Angeles, Toronto*

New du Pont Cellophane

A new thin gauge polymer-coated cellophane designed for packaging greasy and oily products, was introduced recently by E. I. du Pont de Nemours & Co., Wilmington, Del. Designated "K-203," this new 300 gauge film is said to have improved durability and appearance characteristics. It is non-fogging, can be used for carton over-wrapping, and according to Robert C. Myers, packaging sales manager, will be added to the firm's lines of packaging films in the near future.

—★—

New Rheem Plant

Rheem Manufacturing Co., New York, will build a steel container manufacturing plant on a five-acre site in the Port of Tacoma Industrial Tract, Tacoma, Wash., it was announced recently by E. F. Paquette, container division vice-president and general manager. Rheem recently purchased the land from the Port of Tacoma Authority. The new unit will contain 18,200 square feet of floor space. Completion of construction is scheduled for the fall.

—★—

New Tape Dispenser

Better Packages, Inc., Shelton, Conn., recently introduced a new power tape dispenser with electronically controlled tape feeding, measuring and moisturing. Called "Tape-O-Matic #3," the unit is designed for a variety of taping installations, from sealing individual shipments of different sizes to runs of similar size units. It can be used on either a packing table or conveyor line.

IMITATED...BUT NEVER DUPLICATED IN PERFORMANCE—

THE *Precision Valve*

We, at Precision, are justifiably proud of the performance record that the Precision Valve has achieved in the hands of thousands of users.

Precision is today the largest manufacturer of Aerosol Valves. Largest because of our designing, engineering and manufacturing methods which have created a quality, economical product, that has proved itself in use. Over 500 Million Precision Valves offer proud testimony of our ability to create THE VALVE for your product.

Whatever your aerosol product does... It will do it better with a Precision Valve.

Why not call today... Our laboratory and engineering staffs are available to aid you with your valve requirements.

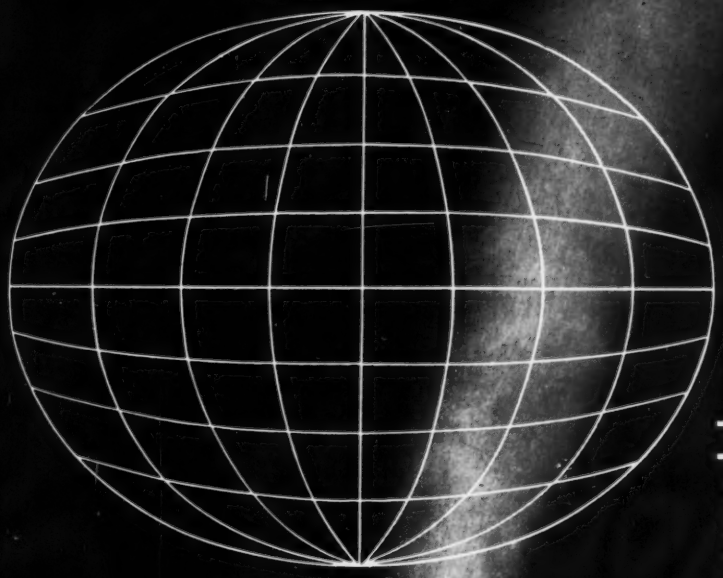
"Known throughout the World"

PRECISION

Precision Valve Corporation

700 NEPPERHAN AVENUE • YONKERS 3, NEW YORK

P. & S. Perfumes for Aerosol Products



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- Eau de Cologne
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- Insecticides
- Pharmaceuticals
- Paints and varnishes
- Fixatives
- Shaving Creams

Polak & Schwarz Inc., 667 Washington Street, New York 14 (N.Y.)

NEW Trade Marks

THE following trade marks were published in recent issues of the *Official Gazette* of the U. S. Patent Office in compliance with section 12(a) of the Trade Mark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. See rules 20.1 to 20.5. As provided by section 31 of the Act, a fee of $25 must accompany notice of opposition.

Glass Wax—This for cleaner and polish for glass and metalware. Filed Dec. 16, 1947 by Gold Seal Co., Bismarck, N. D. Claims use since Sept. 15, 1945.

White Tar—This for insecticide.. Filed May 20, 1955 by Koppers, Inc., Pittsburgh. Claims use since 1943.

Smithereen—This for insecticide and pesticide. Filed Mar. 13, 1956 by The Smithereen Co., Chicago. Claims use since 1888.

Siliconex — This for wetting agent ingredient of laundry starch. Filed Oct. 9, 1956 by Hood Chemical Co., Ardmore, Pa. Claims use since Aug. 20, 1954.

Thanolin—This for beard softener in shaving cream. Filed Sept. 16, 1955 by Carter Products, Inc., New York. Claims use since May 31, 1955.

Scotch Kooler—This for grill and oven cleaner. Filed Apr. 9, 1956 by Hamilton Metal Products Co., Hamilton, O., now by change of name to Hamilton-Skotch Corp. Claims use since Mar. 8, 1956.

Praise—This for toilet soap. Filed Mar. 7, 1957 by Lever Brothers Co., New York. Claims use since Mar. 4, 1957.

Propex — This for furniture polish. Filed Apr. 20, 1956 by Socony Mobil Oil Co., New York. Claims use since Dec. 28, 1955.

Sanelim—This for insecticide. Filed Mar. 5, 1956 by Bardmatic Corp., Muskegon, Mich. Claims use since July 28, 1954.

Urox — This for herbicides. Filed Apr. 2, 1956 by Allied Chemical & Dye Corp., New York. Claims use since Feb. 1, 1956.

Amazing—This for insecticides and fungicides. Filed Aug. 3, 1956 by Fertilizer Products Corp., doing business as Fox Fertilizers, Collingswood, N. J. Claims use since July 16, 1956.

Sanikem—This for liquid bowl cleaner. Filed June 27, 1956 by Anipro Chemical Corp., doing business as Sanikem Manufacturing Co., Brooklyn, N. Y. Claims use since Mar. 26, 1956.

Dream Curl—This for shampoo. Filed Aug. 21, 1956 by Andrew Jergens Co., Cincinnati. Claims use since Aug. 15, 1956.

Glenn's—This for sulphur soap. Filed Oct. 3, 1956 by Marjorie M. Keller, doing business as Century National Chemical Co., Paterson, N. J. Claims use since July, 1871.

Splash—This for soap. Filed Oct. 24, 1956 by Parfums Evyan Inc., New York. Claims use since about June, 1948.

Johnson's—This for polish and cleaner for shoes. Filed May 9, 1956 by S. C. Johnson & Son, Inc., Racine, Wis. Claims use since Dec., 1922.

Mac's — This for automobile cleaner and polish. Filed June 28, 1956 by Mac's Super Gloss Co., Los Angeles. Claims use since 1938.

Poliglo — This for furniture polish. Filed Dec. 31, 1956 by Arkansas Co., Newark, N. J. Claims use since Feb. 23, 1956.

Mylone — This for fungicide. Filed Aug. 16, 1956 by Union Carbide and Carbon Corp., New York. Claims use since July 17, 1956.

Oven-Speed — This for oven cleaner. Filed Oct. 22, 1956 by Fenco Corp., San Francisco, Calif. Claims use since Sept. 17, 1956.

Deterger — This for surface active agent for general industrial use. Filed Sept. 28, 1956 by Dowell, Inc., Tulsa, Okla. Claims use since Feb. 1, 1950.

Phoracide — This for insecticides. Filed Nov. 19, 1956 by R. B. Stoller, doing business as Stoller Research Co., Santa Cruz, Calif. Claims use since Aug. 13, 1956.

Gems—This for laundry bluing and bleach. Filed Dec. 6, 1956 by Stevens-Wiley Manufacturing Co., Philadelphia. Claims use since Oct. 29, 1956.

Regatta — This for shaving cream. Filed Oct. 5, 1956 by Fuller Brush Co., Hartford, Conn. Claims use since about Feb. 1, 1956.

Wonder — This for paint remover. Filed Mar. 8, 1956 by Wilson-Imperial Co., Newark, N. J. Claims use since Feb. 27, 1956.

I-O-Brite—This for soluble detergents containing iodine. Filed Sept. 14, 1956 by Britex Corp., Boston. Claims use since Aug. 16, 1956.

5-Minute — This for foam cleaner for dogs and cats. Filed Oct. 18, 1956 by House of Houston, Inc., Coral Gables, Fla. Claims use since July 11, 1956.

King Karr—This for combination automobile cleaner and polish. Filed Sept. 26, 1956 by Douglas G. Keys, doing business as King Karr Consolidated, Lake Worth, Fla. Claims use since Apr. 1, 1956.

Copper Joy — This for metal polish. Filed Jan. 9, 1957 by Robert P. Rudolph, doing business as The Rojan Co., Beverly, Mass. Claims use since Sept. 28, 1953.

Wink—This for aerosol insecticide. Filed June 6, 1955 by Copley of Boston, Inc., Boston. Claims use since Apr. 1, 1955.

Phosdrin—This for insecticide. Filed Sept. 14, 1956 by Shell Chemical Corp., New York. Claims use since Aug. 17, 1956.

Sesone — This for herbicide. Filed Nov. 2, 1956 by Union Carbide and Carbon Corp., New York. Claims use since Oct. 15, 1956.

Double O—This for room deodorant compound. Filed Dec. 11, 1956 by Tabtrol Co., Baltimore. Claims use since Nov. 30, 1956.

Columbia-Minerva — This for powdered and liquid soap. Filed Apr. 17, 1956 by David Traum Co., New York. Claims use since Mar. 14, 1956.

Sted-Ette — This for detergent for use in washing machines. Filed Aug. 24, 1956 by Monsanto Chemical Co., St. Louis. Claims use since July 20, 1956.

Sun—This for liquid detergent. Filed Nov. 20, 1956 by Los Angeles Soap Co., Los Angeles. Claims use since Sept. 28, 1956.

Mr. Boots—This for shoe polish. Filed July 2, 1956 by Louis M. Fisch, doing business as Mr. Boots Sales Co. and F&M Shoe Shine Kits, Hollywood, Calif. Claims use since July 2, 1956.

Signet — This for liquid floor wax. Filed Jan. 25, 1956 by J. I. Holcomb Manufacturing Co., Indianapolis, Ind. Claims use since Jan. 2, 1957.

Chlorowax 50—This for liquid paraffin wax. Filed Feb. 27, 1956 by Diamond Alkali Co., Cleveland. Claims use since March, 1955.

Calnox—This for surface active agents for industrial use. Filed Mar. 27, 1956 by Atlas Powder Co., Wilmington, Del. Claims use since Apr. 21, 1952.

Muncy's—This for insecticides and disinfectants. Filed May 24, 1956 by William T. Muncy, doing business as W. T. Muncy Co., Kansas City, Kans. Claims use since about April, 1925.

Novon — This for weed killer. Filed July 26, 1956 by Dow Chemical Co., Midland, Mich. Claims use since May 2, 1956.

Dow 9-B—This for fungicide. Filed July 26, 1956 by Dow Chemical Co., Midland, Mich. Claims use since Nov. 1, 1946.

Air-Disk—This for air deodorant. Filed Aug. 13, 1956 by Foster Brothers Co., Decatur, Ill. Claims use since Jan. 2, 1949.

Sani-Pool—This for disinfectant and deodorant for swimming pools. Filed Nov. 9, 1956 by Chlorine Solutions Co., Los Angeles. Claims use since Aug. 15, 1956.

Chick-Chick — This for shampoos. Filed Dec. 5, 1956 by Beardmore Products, Inc., East Rutherford, N. J. Claims use since Nov. 27, 1956.

Boyer's — This for deodorant for septic tanks and cesspools. Filed Jan. 7, 1957 by Boyer Chemical Co., Chicago. Claims use since Jan. 1, 1948.

Texinol—This for cleaner for floors and walls. Filed July 5, 1956 by Walter G. Legge Co., New York. Claims use since Mar. 1, 1932.

Mallo Dip—This for dinnerware stain cleaner. Filed July 6, 1956 by P. R. Mallory Plastic, Inc., Chicago. Claims use since Oct. 15, 1955.

Vizual—This for shampoo. Filed Dec. 5, 1956 by Charles Fuller, Bloomfield, N. J. Claims use since Oct. 18, 1956.

Delphene—This for insect repellent. Filed Jan. 22, 1957 by Hercules Powder Co., Wilmington, Del. Claims use since Sept. 18, 1956.

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MANUFACTURERS OF CLOSURES, CONTAINERS AND MACHINERY

PRESSURE PACKAGING

COMMENTS on the 1956 aerosol products survey, conducted by the Aerosol Division of the Chemical Specialties Manufacturers Assn., are still being heard in pressure packaging circles. The results of the survey, which were released during the 43rd midyear meeting of CSMA in Chicago in May, contained a number of surprises – for some people, anyway.

The big jump in volume of aerosol hair lacquers (from 53,790,785 units in '55 to 79,640,927 last year) was enough to bump insecticides out of first place for the first time since the surveys began. Although not totally unexpected, since insecticides generally had a tough time in 1956, which was a poor year for bugs, the size of the gain made by hair lacquers was breath-taking for many aerosol marketers.

Percentagewise, interestingly enough, it was not hair lacquers which showed the biggest advance in 1956 over 1955, but the category designated as "Other Household Products," which includes cleaners of all types, such as glass, metal, oven, rug and upholstery; waxes, insect repellents, water repellents, shoe dressings, etc. This group of aerosols gained from 6,204,103 to 23,082,683. For those who are wondering "how come?", the answer is easy: "Jet Spray Bon Ami." Now, while we don't say that this one product was responsible for the entire increase in production of aerosol household products, it certainly was a heavy contributor to the growth in this category.

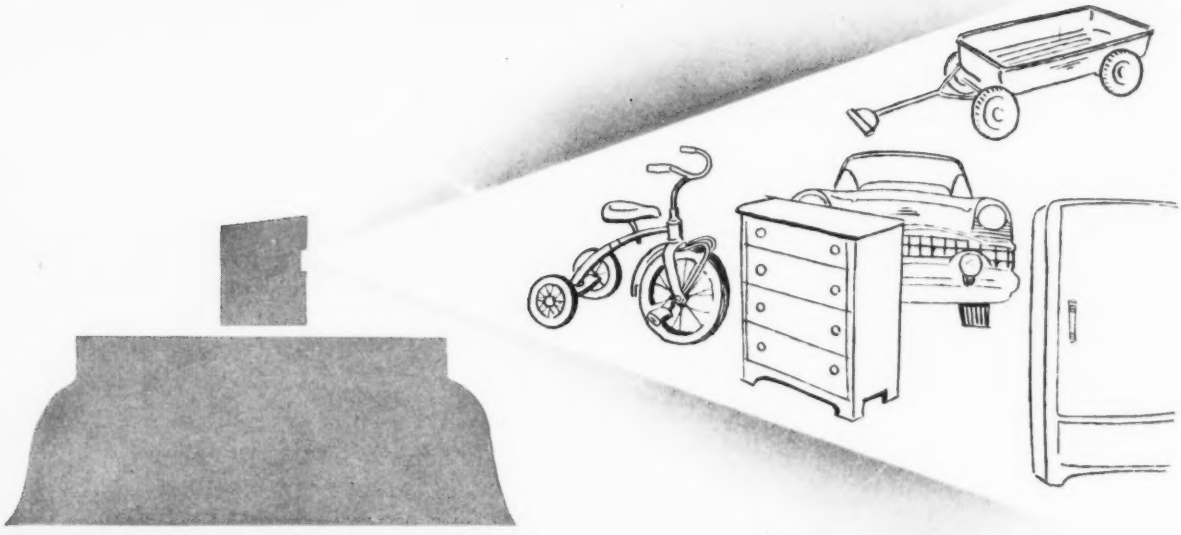
The million dollars or so that have been spent in introducing and promoting "Jet Spray Bon Ami" have been responsible for the great sales success of this product. The promotion of this pioneer product is bound to attract followers, which will have the effect of broadening the market for aerosol cleaners of this type. So, it is reasonably safe to predict that there should be good growth again in 1957 over 1956 in pressure packed household products. In addition, with the development of the new insect repellent diethyl toluamide, and its commercial application in an aerosol package, another classification of the "Other Household Products" category should show some healthy growth in 1957. The most recent trade reports on the sales of "Off," Johnson's aerosol insect repellent based on diethyl toluamide, were that the product was selling very well. In fact, demand was greater than the supply in some areas. As other brands are marketed sales of personal insect repellents may be expected to expand.

One comment made on the success of "Jet Spray Bon Ami" was: Based on sales of five million cans and an advertising and promotion expense of a million dollars, isn't 20 cents a can out of line for promotion cost? That's one maybe our merchandising friends would like to answer for us. However, we feel that the five million figure is on the low side, and by maybe as much as 25 per cent.

Although there has been considerable optimism regarding the future possibilities of pharmaceuticals in aerosol packages, so far growth in this category seems slow. In 1955, 1,455,179 units were reported packaged; a year later the total was 2,275,175. Possibly a large gain will be made in 1957, but as one loader expressed himself to us recently: "We fool around for six or eight months trying to get set with a pharmaceutical house and then we get an order for 75,000 units." Some sections of the medical profession are less than enthusiastic about the tremendous possibilities of adopting the aerosol principle for the packaging and dispensing of pharmaceuticals. Could be these are just isolated views? Maybe, but we are throwing them out for what they are worth.

The rather sharp decline in the "Other Personal Products" category has a number of marketers mumbling in their beards. Such aerosol products as shampoos, personal deodorants, sun tan oils, hand lotions, powders, depilatories, etc. are included. Totals for these products in 1956 dropped close to 50 per cent. The drop is more a matter of bookkeeping than actuality, it would appear. Last year colognes and perfumes were part of this category. In the 1956 figures colognes and perfumes are reported separately, and show a total of 8,768,927 units. However, when added to "Other Personal Products" of 7,629,201 the total for 1956 is still only 16,398,128, against 14,220,783 for 1955. Improvements and innovations in other forms of packaging, notably polyethylene type squeeze bottles and roll-on personal deodorant dispensers may be cutting into pressure package totals in this category. Improvements in "squeeze bottles" are something aerosol marketers and fillers are going to have to watch from a competitive standpoint. Already, "squeeze bottle" production totals of 350 million units annually are significant, and producers of these packages are acting more aggressively in their promotion and courting of the soap, detergent and chemical specialties market.

The fade in volume of aerosol shave cream sales last year, as compared with 1955, is also being regarded with concern. Although part of the explanation may seem to lie in the proliferation of new brands, for which demand may seem to be tapering, one wonders about the effect of the widening use of electric shavers on the total market for shave products. Un-



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One of the largest potentials in the expanding field of pressurized products is the market for aerosol paints. Combining the convenience and tidyness of the aerosol package with the nation's current "do it yourself" mood, spray paints for touching up toys, cars, furniture, woodwork, appliances and a host of other household tasks have a sure-fire appeal. With their primarily indoor function, it is particularly important for aerosol paints to be either odorless, or pleasantly scented. This involves both masking and/or reodorizing the solvents and the resins, at the same time keeping the total formulation compatible with propellent and container. The D&O Aerosol Testing Laboratories have successfully resolved this problem for a number of different aerosol paint products, including *lacquers, enamel, paint removers* and *solvent combinations.* This experience, and the facilities of the labs, are at your service! Consult D&O.

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Part of the group of over 30 women's editors of newspapers, wire services, homemaking and shelter and trade magazine representatives at aerosol press conference in New York last month.

questionably it is a factor now and the likelihood is that it will be increasingly more so in the future.

Lest these comments sound unduly pessimistic, they should be balanced against two predictions made quite recently by two authorities on aerosols. Speaking as a panelist in a symposium discussion to commemorate 10 years of low pressure aerosols at the recent CSMA meeting in Chicago, John N. Heinen, Jr., manager, packaging engineering, Continental Can Co., Chicago, stated that an annual output of one billion aerosols in 1960 is not too unrealistic. Considering that we are now half way through 1957, our comment is: "Wow"!

A further quote on aerosol growth was made recently by Frederick G. Lodes, of Lodes Aerosol Consultants, Inc., New York, and chairman of the Aerosol Product Survey Committee. Speaking at the press party for women's editors of newspapers, wire services, homemaking and shelter magazines in New York, last month, Mr. Lodes predicted that sales of aerosols in 1957 would reach $420 million, up $100 million from 1956. The press party, for which the Aerosol Division of CSMA was host, was held to mark the production of the billionth pressure-packaged, push-button aerosol. Over 30 editors or press representatives were on hand for the affair. In addition to being given demonstrations of actual commercial aerosols, the press people saw the motion picture, "The Spray's the Thing," a film on aerosols produced for the Freon Products Division of E. I. du Pont de Nemours & Co. This was preceded by a demonstration of actual cold and pressure filling of an aerosol shave cream and a perfume. General Chemical Division of Allied Chemical & Dye Corp., New York, put on the actual demonstration of filling.

Although the immediate results of the press party, which was put on as part of the publicity program of the Aerosol Division, may not bring in a rash of newspaper and magazine clippings, it was helpful in giving these women editors information about the aerosol principle. They seemed very much impressed with the du Pont film, and at least one woman editor after seeing General Chemical's demonstration admitted, "Oh, now I see how it works." Each consumer paper or magazine editor was given a reusable bag of aerosol products.

★

Aerosol Seminar Aug. 20

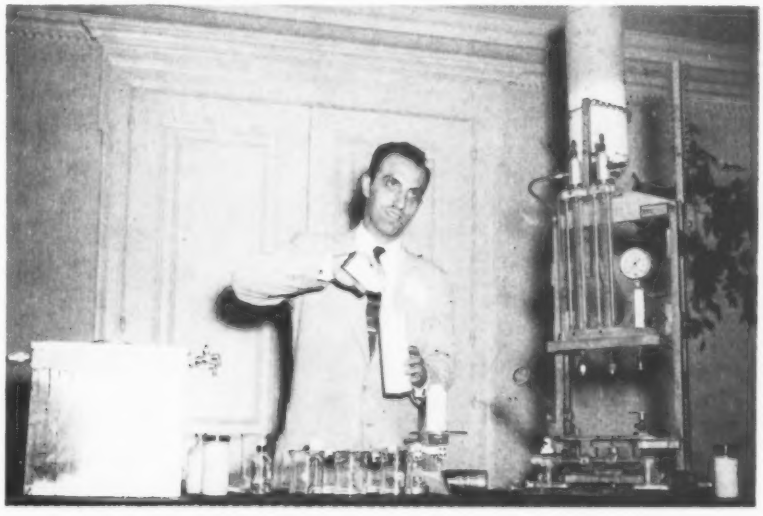
An aerosol seminar for pharmaceutical manufacturers will be held at the Philadelphia College of Pharmacy, Tuesday, August 20, it was announced early in June. The seminar, for which there is a $10.00 admission fee, is an all-day affair, starting at 9:15 a.m and concluding at around 4:00 p.m.

Representatives of firms supplying aerosol packaging and formulation components are to participate in the seminar. The tentative program calls for opening remarks by Dr. Linwood F. Tice, associate dean and director of the Department of Pharmacy of the college. A panel type discussion, for which Dr. Martin Baar is to be moderator, will cover such subjects as the aerosol market, the aerosol package, containers and valves.

Either Ralph Crane of the Freon Products Division of E. I.

(*Turn to Page* 176)

John Frangos, aerosol technical service specialist of General Chemical Division of Allied Chemical & Dye Corp., New York, gives actual aerosol loading demonstration at aerosol press conference.



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Now—in solving metal ion problems—you can have your cake and eat it! Thanks to Versene® 100, a liquid concentrate of tetrasodium salt of ethylenediaminetetraacetic acid.

Stable to acids and alkalies even in boiling solutions, Versene 100 inactivates calcium, magnesium and other metal ions. It will not revert to an inactive form. Versene 100 ties up these contaminants completely within an inner ring structure . . . actually forms a new, harmless compound with hardness and trace metals in solution. Applications in textile and rubber processing, in chemical purification and boiler descaling, in soaps, syndets, all types of detergent formulations have proved Versene 100 the most versatile and effective chelating agent commercially available. And now, it's also the most economical! Available from two stock points at Framingham, Massachusetts, and Freeport, Texas.

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Fact is, you'll find this booklet's discussion of the chemistry of chelation, Dow chelating agents and their uses helpful in correcting any metal ion problem. With the Versene and Versenol products practically every metal ion in any solution can be chelated. Contact your nearest Dow sales office for "Keys to Chelation". Or write us direct. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. CA 1313RA.

*Trisodium salt of N-hydroxyethylethylenediaminetriacetic acid

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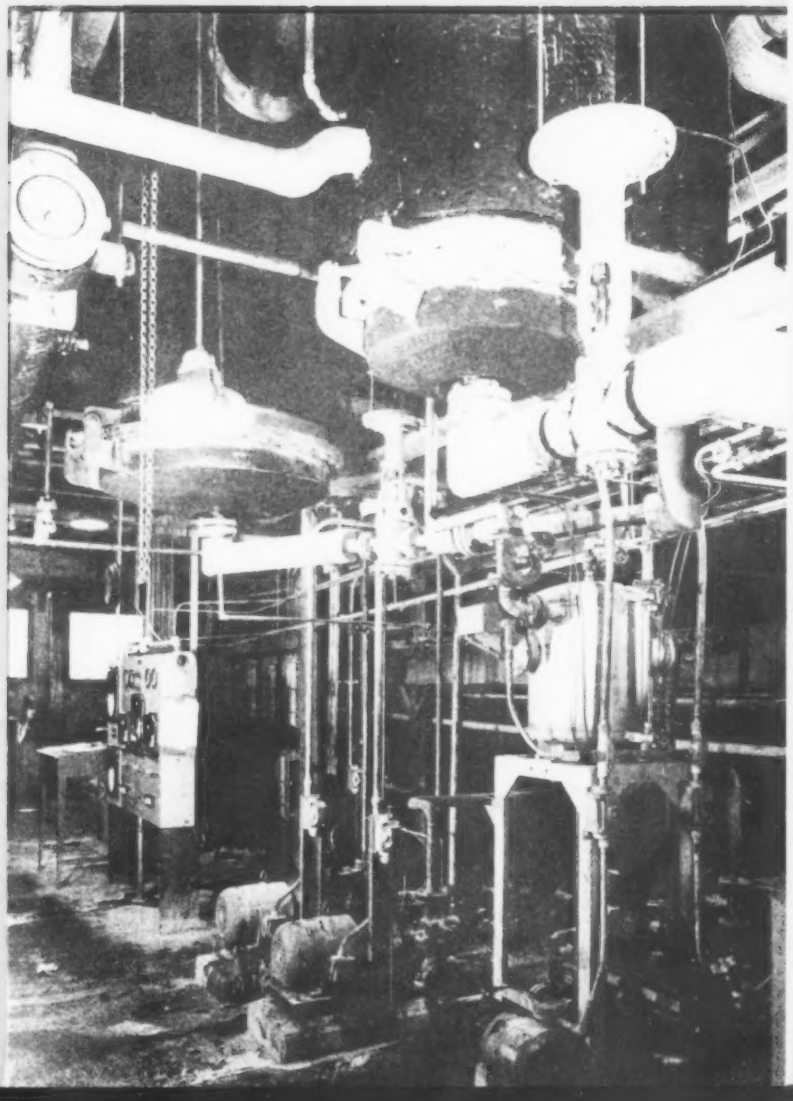

Buflovak double-effect evaporator increased production of 60 per cent glycerine to more than 3,000 pounds per hour at Emery Industries, Inc., Cincinnati. Two insulated steam chests are supported about eight feet above floor level. Instrument panel can be seen in background. Other details on the new unit are contained in article beginning on page 135.

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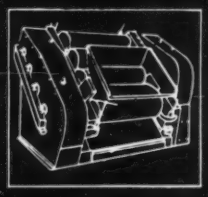
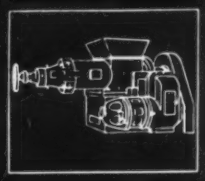
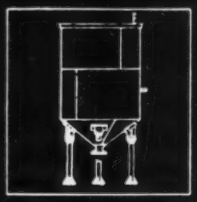


MILLS



PLODDERS



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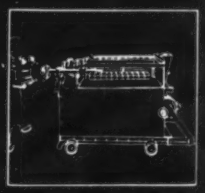
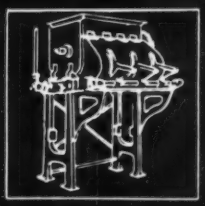
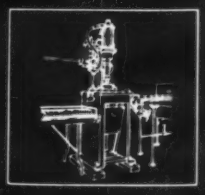


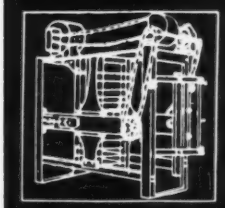
TOILET SOAP CUTTERS



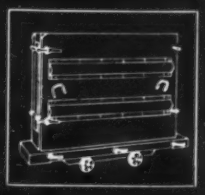
AMALGAMATORS



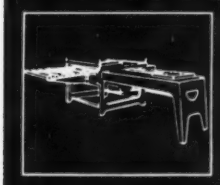
PRESSES



SLABBERS



SOAP FRAMES



LAUNDRY SOAP CUTTERS

VARIABLE SPEED CRUTCHERS

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HAWTHORNE, NEW JERSEY, U. S. A.

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Fluid Mixing of Chemical Specialties

By James Y. Oldshue*
Mixing Equipment Co.,
Rochester, N. Y.

PART II

SOLIDS concentrations used in most chemical specialties are not as high, as in the chemical and metallurgical industries. The ease or difficulty experienced in making a suspension of solids is determined by the settling velocity of the solid particles and the viscosity of the medium.

Fine abrasives for instance have a low settling viscosity and, if suspended in a fluid of 50 Cp or higher, they will show little tendency to settle out. To obtain a relatively stable suspension it is advisable to incorporate the solids during the emulsification step of the manufacturing sequence.

Efficiency of suspension operations depends on the ratio of the impeller's diameter to the diameter of the tank and on the position of the impeller in relation to the bottom of the tank. In this type of operation a turbine impeller usually works more economically than the paddle type.

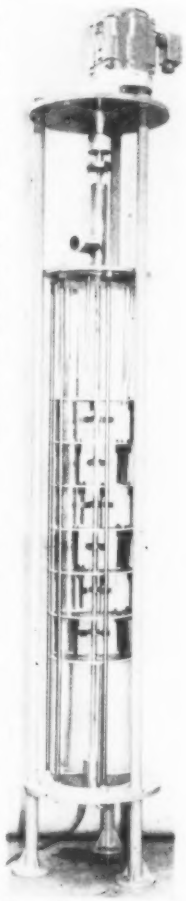
A common suspension problem in chemical specialties manufacturing is presented by a storage tank preceding a filling machine. In such tanks solids must be kept in uniform suspension down to very low levels. The answer will be provided by an eight inch impeller operating in a well, about 12 inches in diameter and 10 inches deep, placed in the bottom of the tank. By this device uniform solids suspension is ensured to the lowest possible level.

Formulation and intensity of mixing determine stability characteristics of a liquid/liquid emulsion. The fluid shear of the mixer must be such as to produce a droplet size in balance with the interfacial dynamics of the system. If the mixer produces a size smaller than is consistent with the stable system value, settling and coalescing will occur, until a dynamically stable emulsion results, which is not affected by other changes in mixing conditions.

If the mixer produces a droplet size too small to form any stable systems, then changes in the fluid shear of the mixer will cause a corresponding change in the final product.

High speeds and small ratio of impeller to tank size are frequently employed to produce emulsions. However, there are some practical limits on the level of fluid shear possible in a mixing vessel and initial dispersion by mixer may have to be followed by processing in a colloid mill or homogenizer.

Fig. 12. Six-step pilot plant column.



In the chemical processing industries one mixing operation frequently involves a sequence of several reaction steps. For such operations continuous flow may be preferable to batch processing. The translation of a chemical batch process into a continuous flow system calls for the consideration of two main factors: concentrations and residence time. MacMullin and Weber (1) give curves illustrating several cases. If correctly designed the continuous system usually yields a product similar to that from a batch system.

However, if the process requires stringent control of residence time, then the installation of a continuous system must be considered very carefully, because its product may be at variance with that from the batch process. In a continuous set-up each particle remains in the system for a different length of time resulting in a mixture of material which has been in the reactor for varying periods. Probability methods have been evolved by which one may predict how much material stays in the system longer than a given period of time. The subject has been covered by MacMullin and Weber (1).

A continuous flow set-up may consist either of separate tanks for each reaction step or of a compartmented column. The column shown in Fig. 12 allows for six steps. It is 12 inches in diameter and primarily designed for pilot plant study.

Four basic types of mixers are available for fluid mixing: laboratory mixers; top-entering propeller type, portable or perma-

*Paper presented before the 43rd midyear meeting, Chemical Specialties Manufacturers Association, Chicago, May 22, 1957.

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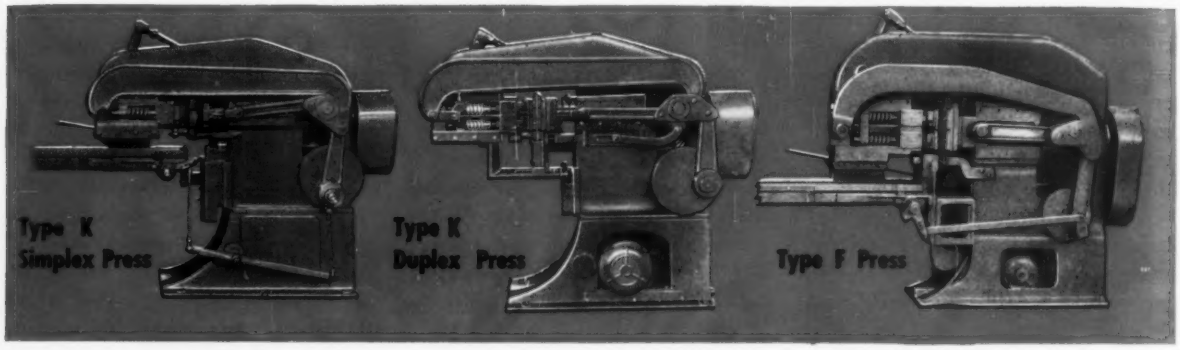
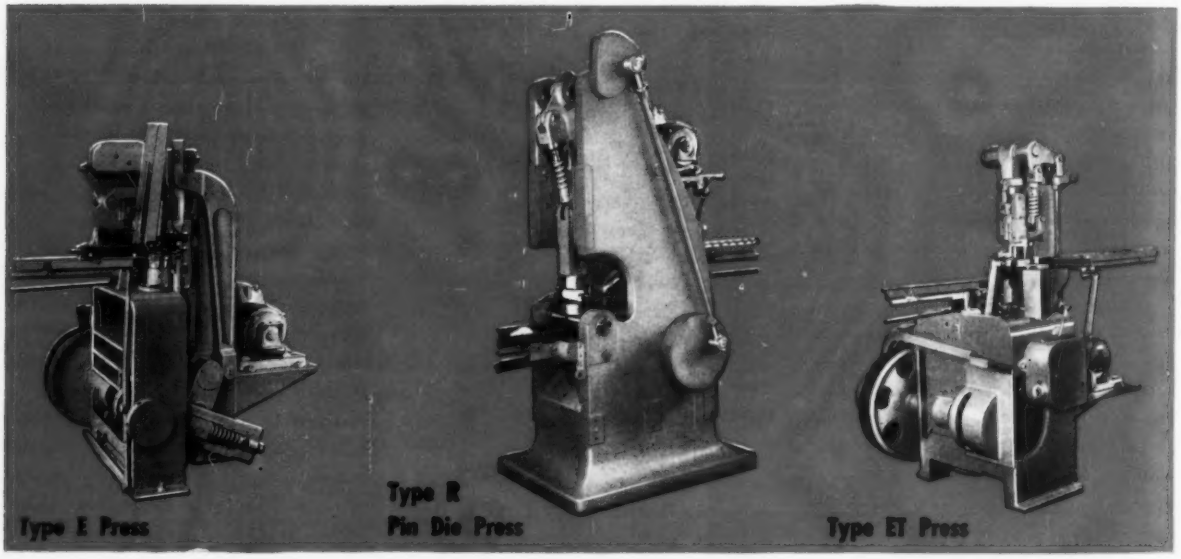


For toilet or laundry soap cakes of any shape (except highly convex cakes) with side band. Speeds of 120-140 cakes per minute.

Applications same as Type K Simplex. Presses two cakes simultaneously. Speeds up to 250 cakes per minute.

For large toilet or laundry soap cakes. Available in Simplex or Duplex Models, pressing one or two cakes per stroke.



For small toilet soap cakes (1½ oz. or less). Speeds up to 200 cakes per minute.

For toilet soap cakes of unusual shape, oval cakes, or cakes having highly convex faces, with or without side band. Speeds up to 100 cakes per minute.

For small toilet soap cakes with side band. Speeds up to 120 cakes per minute.

R. A. JONES & CO., INC.

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Cartoners — Case Packers — Soap Presses

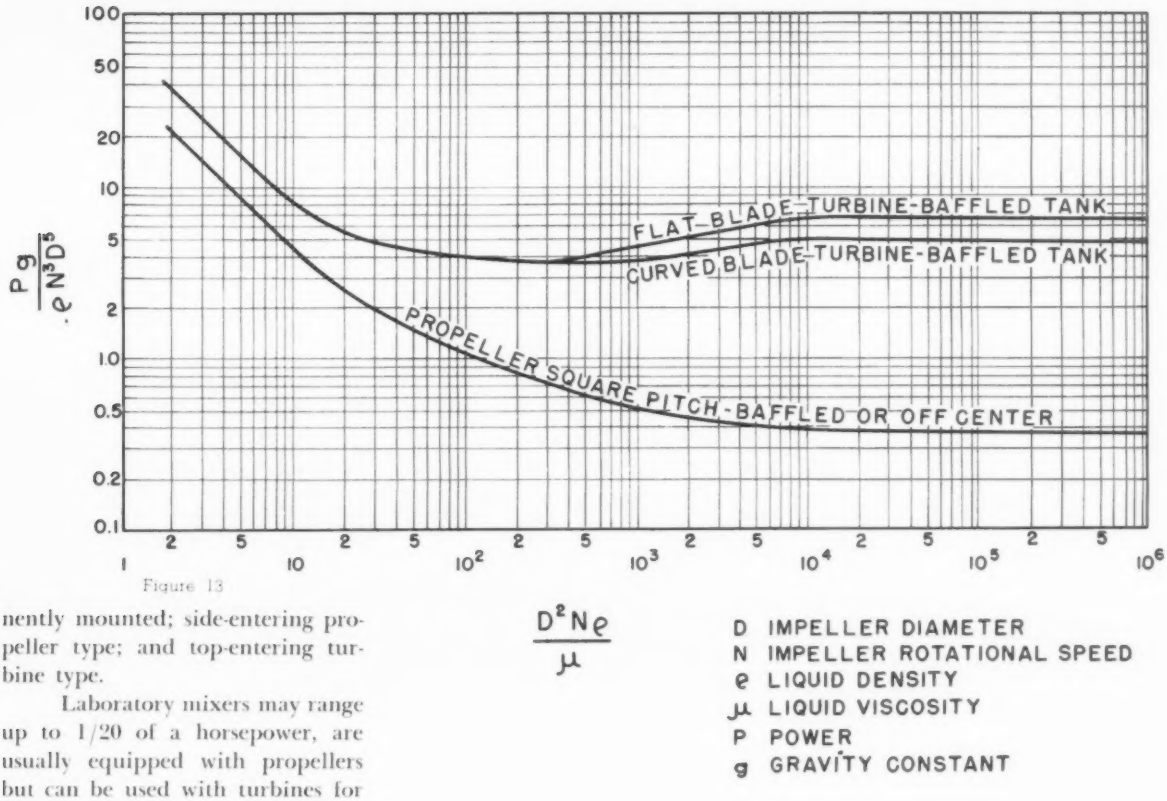

Figure 13

nently mounted; side-entering propeller type; and top-entering turbine type.

Laboratory mixers may range up to 1/20 of a horsepower, are usually equipped with propellers but can be used with turbines for scale-up work. Such units are available with different types of drive and with constant speed and variable speed.

Top-entering propeller type units may feature either gear drive or direct drive. Gear drive mixers are most suitable for operations requiring high pumping capacities, such as blending or heat transfer. Direct drive units may be used in operations which are not so sensitive to flow, such as dissolution of solids, dispersions, emulsions, and similar applications. These mixers may be either temporarily clamped to the side of the tank, or permanently mounted with or without stuffing boxes or mechanical seals.

Side-entering propeller type mixers (Part. 11) range in size up to 25 HP and are equipped with propellers capable of 420 rpm. They are very effective in blending, heat transfer and other operations requiring high flow. Usually these units are permanently mounted on the side of the tank and are equipped with a stuffing box or a mechanical seal. They may be gear driven or belt driven, depending upon the requirements of the plant.

Top entering turbine type mixers (Part I) range from three HP upwards. They operate at speeds of from 56 rpm to 125 rpm, but can be used at any speed from 16½ to 420 rpm, with 1750 motors. If fitted with change gears the turbine mixer is a very flexible piece of equipment, adaptable to a wide variety of requirements.

Power Consumption

When setting up a mixing unit it should be specified for the maximum load conditions likely to be encountered. Choice of impeller type should be determined by the size of the unit and the flow and pumping characteristics required by the operation. Next the viscosity of the fluid to be processed must be determined. At this point three variables remain: Power, speed of impeller and diameter of the impeller. As shown above, only two of these variables are independent. Therefore, when designing a mixing unit with a definite job in mind two independent choices are possible.

Let us assume that the propeller type has been selected. Power characteristics of such a unit can be plotted by a curve which shows a power number versus a Reynolds number (Fig. 13). At a given speed and diameter and with increasing viscosity the power curve remains comparatively level over a wide range of viscosities before it begins to rise.

Supposing a turbine type impeller has been selected. The power drawn by such a unit remains constant in spite of viscosity increases up to about 50 Cp. The power curve then dips and rises again to its water value at about 50,000 Cp. Further increases in viscosity lead to a steep rise of the power curve. Thus a broad range of viscosities may be accomodated by a turbine type mixer without risk of overloading the unit.

It is most important that the power level drawn by a mixing unit at the high viscosity stage of

MECCANICHE MODERNE

CORSO SEMPIONE, 51 — BUSTO ARSIZIO (ITALY)

"SABIZ" SPRAY DRYING PLANT

"BALLESTRA" Patent

Manufacturing Characteristics

Atomization spray nozzles.
Adaptable to three modes of operation: parallel flow, countercurrent and mixed flow.
Product discharged at room temperature; eliminates agglomeration.
Free discharge of product without use of auxiliary equipment.
Direct or indirect utilization of gases obtained by the complete combustion of fuel oil or natural gas.
One main panel for control and operation.
Automatic continuous perfuming possible.
Can spray dry heat sensitive products.

Standard Outputs

From 250 Kgs. per hour up to 3000 Kgs. per hour and more, if required.
Efficient operation of the plant results in substantial savings.

Physical Characteristics of the Dried Products

From the same slurry, merely by adjusting some valves, it is possible to get:
Dried products such as hollow beads or fine powder.
Crystallized products such as beads or granules.

Adjustable to a wide range of specific gravities

from the same slurry. If used for synthetic detergents, this plant can be operated automatically in connection with our continuous sulfonation plant "SULFAN."
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Please don't hesitate to ask for references, analyses, offers, samples, visits to factories equipped with our plants, etc.

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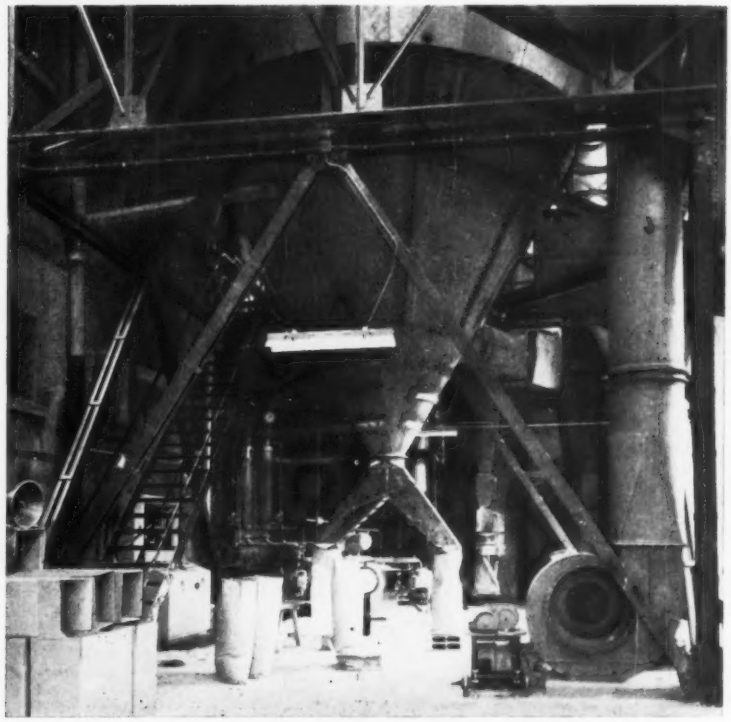


the operation is sufficiently high to ensure adequate mixing action.

Power consumption of the impeller is determined by speed and diameter. Since the consumption varies with the cube of the speed and the fifth power of the diameter, even minor changes in these two factors cause major changes in power requirements. Before such changes are made it is imperative to consult formulae, such as illustrated in Fig. 13, to calculate the effect on the power drawn by the unit. Additional data for various types of impellers are given by Rushton, Costich and Everett (4).

Scale Up Calculations

Scale up calculations are based on similarity relationships. In the case of mixing operations involving fluids, they are based on the laws of hydraulic similarity. Both geometric and dynamic similarity are important.

Geometric similarity is the first prerequisite of all scale up procedures. Dynamic similarity depends on four fluid forces. The first of these forces is inertia, F_i. This is the force which we apply to the system. It is related to the power, speed and diameter of the impeller.

The other three forces resist the accomplishment of our process; they are viscosity, F_v, surface tension, F_δ, and gravity, F_g. Gravity forces are usually negligible if baffles are used in the tank. Surface tension affects the formation of surface area in a two-phase system, but is usually not of great importance in these systems. Viscosity is the predominant force which influences the fluid regime in the vessel.

The ratio of inertia to viscosity, F_i/F_v, is the Reynolds number, and has the value $\frac{ND^2\rho}{\mu}$. This represents the ratio of the force we apply to the system divided by the resisting force of viscosity and determines the motion of the fluid in the tank.

The process result, [R] alone cannot be correlated with Reynolds number, since [R] has units and depends upon the process definition given to it, while the Reynolds number is a dimensionless ratio. In heat transfer, for example, heat transfer coefficient [h] alone cannot be correlated with the Reynolds number, but it can be combined by the principles of dimensional analysis to give a group, [hd/k], which relates the process performance in the system to the fluid conductivity which governs the rate at which this process result will be obtained. Thus, the correlation of hd/k with N_{Re} holds for all sizes of systems, as illustrated by equation [4].

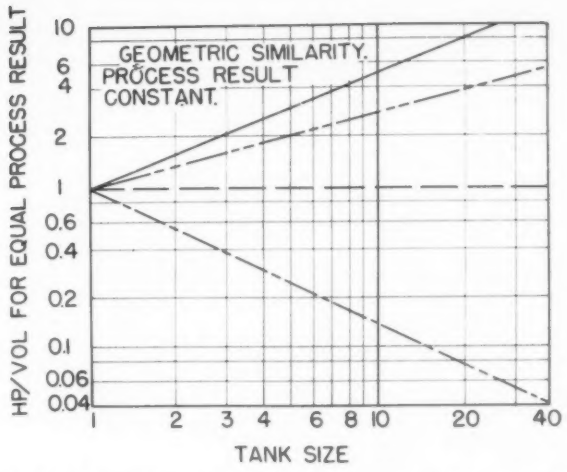


Figure 14. Correlation of four different processes by maintaining geometric similarity.

When a dimensionless ratio involving [R] cannot be used, a second method of analysis may be employed on both a small scale and a large scale for any process in which the fluid properties are constant in both scales. This method is based on the following equation:

$$R = f[F_i] \text{ [scale factor]} \quad [6]$$

Geometric similarity is implied in this relationship. The group representing inertia can either be speed, peripheral speed, power, or power per unit volume for F_i has several sionless number such as Reynolds number.

The choice of index is determined by the scale factor that results. The choice of horsepower per unit volume for F_i has several advantages. One advantage of this choice is that the scale factor varies less above and below unity than that of any group that can be chosen. For scale up, the factor must be known either by previous information, such as research or plant scale data, or must then be determined as part of the pilot plant procedure. Fig. 14 shows a typical form of this type of correlation for four different processes.

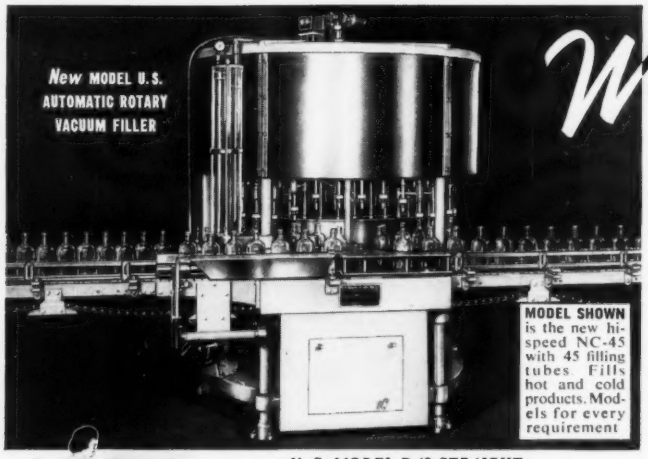
Pilot Plant Studies

The ultimate aim of all designers is to evolve a process which successfully meets the requirements of the plant. To meet this aim an exhaustive study must be made of all available information pertaining to the mixing operation involved. Data must be extrapolated to the plant scale process by the most practical method. The accuracy of this interpolation must be determined and then the range of possible mixer sizes estimated.

At this point is should be possible to evaluate the economic advantages to be gained from a thorough knowledge of the mixing variables involved in this particular process. The importance of these advantages will be the basis on which to judge the merits of a proposed pilot plant study and the extent to which such a study should be pursued. Pilot plant work may range from one "spot check" in a six inch tank, to an extensive project requiring several months' work with equipment for a variety of tank sizes.

The flat blade turbine (Fig.

(*Continued on Page 173*)



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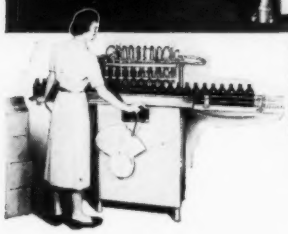

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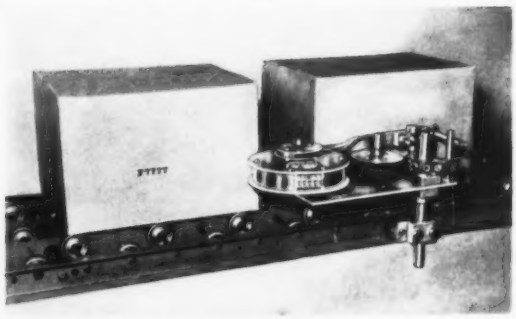

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Emery installs double-effect evaporator —

Doubles Glycerine Yield . . .

YIELD of glycerine from a Colgate-Emery fat splitting process was more than doubled at Emery Industries, Inc., Cincinnati, by installation of a unit type, double effect, vertical, rapid concentration evaporator in place of four, single effect, low capacity units. Designed and built by Buflovak Equipment Division of Blaw-Knox Co., Pittsburgh, Pa., the new equipment stepped up hourly production of 60 per cent glycerine from 1,500 to more than 3,000 pounds. Steam requirements per pound were halved, production costs reduced, and no additional plant space required.

Rated capacity of the Buflovak evaporator is 15,000 pounds her hour input of the 12 per cent glycerine or "sweet water" from the fat splitting process and 3,000 pounds per hour output of the 60 per cent product. But actual throughput exceeds these figures.

High rates of evaporation per square foot of heating surface are attained with extremely low loss from entrainment in high velocity flow through evaporator tubes into the separators. Foaming is inhibited by the rapid concentration of the material as it passes through the long tubes of the evaporator.

Operation of Evaporator

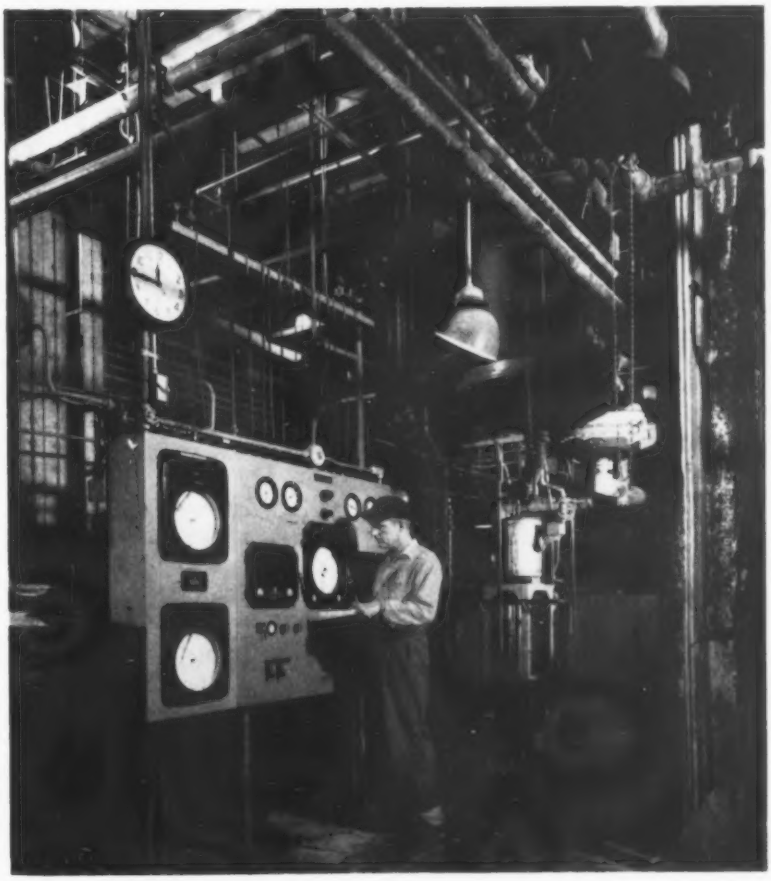
OPERATION of the evaporator is simple and fully automatic. One man operates the unit and other associated processing equipment. Circulation is maintained by thermal differences. Temperatures, flow rates, and other operating conditions were pre-determined by the properties of the available low pressure, excess process steam; the properties of the glycerine; availability of cooling water; and lesser factors. The dilute liquor fed to the first effect and the concentrate discharged from the second effect are automatically controlled by air-operated differential pressure type liquid level controllers. A simple adjustment permits the operator to raise or lower the liquid level to insure maximum operating results.

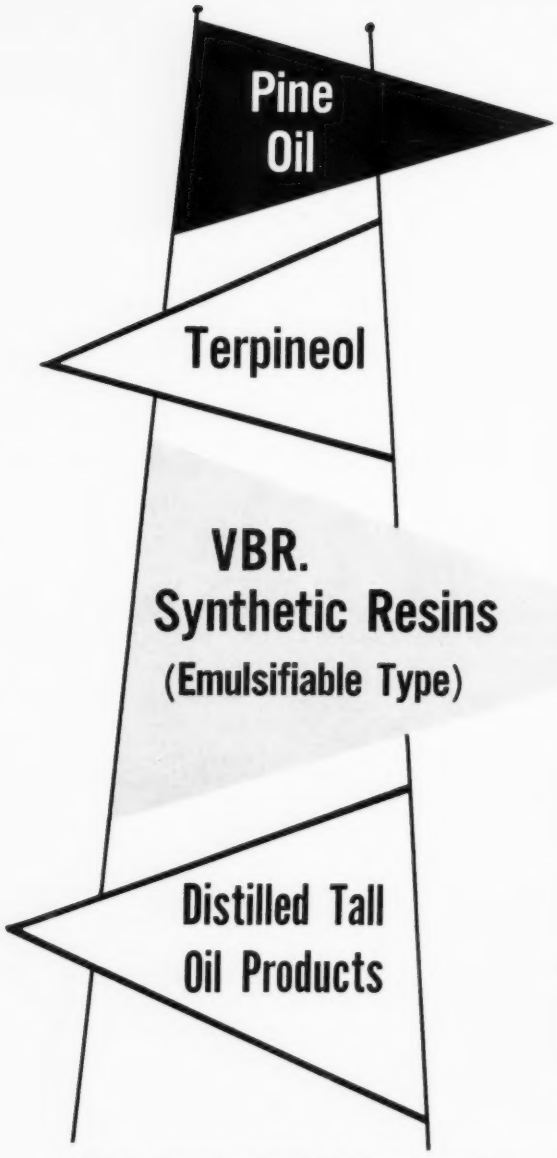
Density of the concentrated glycerine removed from the second effect is held within close limits by an automatic controller. The vacuum in the second effect is automatically maintained by an absolute pressure controller regulating the flow of cooling water to the condenser.

Two indicating controllers on the control panel show liquid levels in the first and second effect evaporators. A recording controller shows the second effect evaporators. A recording controller indicates the second effect liquor temperature. Other recorders give continuous records of steam flow and the liquor

(Continued on Page 147)

Control of Buflovak double-effect evaporator at Emery Industries plant is fully automatic. One man operates evaporator unit and associated processing equipment.





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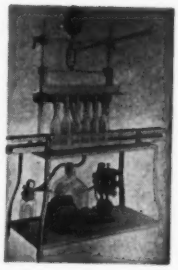

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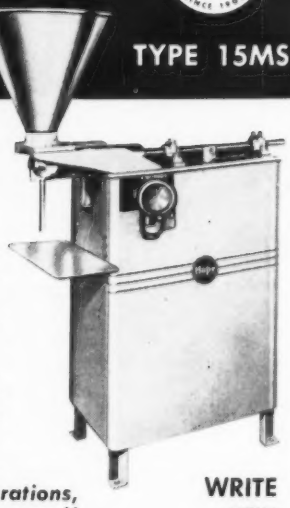

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NEW Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication. Complete copies may be obtained by writing to the publisher of this magazine. MacNair - Dorland Co., 254 W. 31st Street, New York 1, N. Y., and remitting 50c for each copy desired. For orders received from outside of the United States the cost will be $1.00 per copy.

No. 2,791,562. Method of Producing Dry Detergent Compositions, patented by Walter J. Diffley, Wilmington, Calif. This patent teaches a method of producing a dry, granular surface active agent which comprises providing a quantity of anionic surface active acid of the type RAH wherein R is an oil-solubilizing group and AH is an ionizable, hydrophilic, acidic group, said acid being neutralizable by aqueous sodium hydroxide to yield the corresponding sodium salt, RANa, such salt being stable in alkaline solution, said method comprising: neutralizing said acid with an aqueous solution of sodium hydroxide to yield an aqueous slurry of the corresponding sodium salt, RANa; then treating said slurry with a reagent mixture of sodium hydroxide and a salt selected from the group consisting of borax containing not more than ten mols of water of crystallization and disodium phosphate, said mixture being employed in a quantity and in proportions sufficient to react together to form a solid reaction product containing water of crystallization and to thereby eliminate free water from the slurry by formation of such reaction product and to produce a dry granular mixture.

No. 2,792,347. Fatty Acid Mixtures and Soaps Derived Therefrom, patented by Lou A. Stegemeyer, Cincinnati, O., Assignor to Emery Industries, Inc., Cincinnati. Covered is a bar soap comprising the sodium salts of 75 to 95% liquid unsaturated aliphatic monocarboxylic acids of 18 carbons chain length and the sodium salts of 25 to 5% aliphatic monocarboxylic saturated acids of from 6 to 10 carbons chain length.

No. 2,793,237. Process for the manufacture of Dichloro-Diphenyl-Dichloroethane, patented by Everett E. Gilbert, Flushing, and Henry R. Nychka, Bayside, N. Y., assignors to Allied Chemical & Dye Corp., New York. A process is disclosed for preparing 1,1-bis(4-chlorophenyl)-2,2-dichloroethane which comprises subjecting 1, 1-bis (4-chlorophenyl) 2,2,2-trichloroethane to the action of metallic iron and concentrated hydrochloric acid in the presence of a reaction medium consisting of a lower saturated aliphatic alcohol having from 1 to 3 carbon atoms inclusive, at temperatures from about 60° C. to about 100° C.

No. 2,793,154. Pyrethrum Insecticide Synergized with Lower Alkyl Aryl Ketone, patented by George Stuart Shillitoe, London, and Arthur Douglas Harford, Sunbury-on-Thames, England, assignors to British Petroleum Co., London, England. The patent covers a pest-combating liquid composition comprising pyrethrin and phenyl alkyl ketone in which the alkyl group comprises 1-4 carbon atoms, the ratio of the total weight of phenyl alkyl ketone to total weight of the pyrethrin being in the range of from about 5:1 to about 15:1, said pyrethrin and phenyl alkyl ketone being in solution with a liquid hydrocarbon distillate fraction derived from petroleum.

No. 2,793,789. Soap Measuring Device, patented by Kenneth S. Hodge, Pendleton, Oreg. This patent covers a soap-measuring device for application to a soap-containing carton having a top wall provided with an outlet, the device comprising a container having a flat bottom, two vertical side walls, and two end walls, but being open at the top and being provided with an outlet in one wall at a level adjoining the bottom, said container being adapted, in its inverted position, to be applied telescopically to the upper portion of the carton and to be adjusted vertically thereon, a U-shaped member at each end of the container at the top thereof, the member including two legs one of which is disposed along one side of the container outside thereof, while the other leg is similarly disposed along the other side of the container, and a serrated cross bar facing a similar bar of the other U-shaped member, the legs of each member being mounted on the container for a longitudinally sliding movement, and spring means urging each bar into engagement with the respective wall of the carton, the container being provided with a plurality of calibrations on a wall thereof to serve as guiding means for the vertical adjustment of said container.

No. 2,792,349. Soap Cake, patented by Bill J. Le Vier, Pasadena, Calif., and Misch Kohn, Chicago, Ill., assignors to Lever Brothers Co., New York. This patent describes a cake of soap comprising convex upper and lower surfaces, one of which is uniformly convexly rounded in one direction only and about an axis parallel to the general plane of the cake, said surface thereby constituting a portion of a cylindrical surface, and the other surface of which is uniformly convexly rounded about at least one axis parallel to the general plane of the cake, said axis being substantially at right angles to the axis about which said one surface is rounded.

No. 2,793,794. Eduction Valve for Pressure Discharge Dispensers, patented by Arthur J. Samuel, Pittsburgh, Pa., assignor to Gulf Research & Development Co., Pittsburgh. An eduction valve for dispensers is described, which permits discharge from such dispenser in both upright and inverted positions under pressure of a contained gas, comprising, in combination with a receptacle having a manually operated discharge valve assembly, an eduction tube extending from the discharge valve assembly into the receptacle and having a straight section in proximity to the said discharge valve assembly, such straight section being formed with a lateral port in its wall, an imperforate annular member constituting a slide valve mounted on said straight section of tube, means providing a shoulder on said tube against which said slide valve abuts at the extremity of its movement when the receptacle is in upright position and in which position the valve thereby covers the port, the port being so located in the straight section of tube that upon inversion of the receptacle the slide valve in moving to its other extreme position uncovers the port for admission of the pressurized contents into the eduction tube.

No. 2,792,348. Soap Composition, patented by Robert D. Aylesworth, Springdale, O., assignor to Emery Industries, Inc., Cincinnati. This patent discloses a solid fatty acid soap consisting essentially of the sodium salt of an unsaturated, monocarboxylic fatty acid and from one to ten percent by weight of the sodium salt of a dicarboxylic acid having 8 to 10 carbon atoms, based on the weight of the fatty acid content.

★

Brominated Disinfectants

Disinfectant washing and rinsing agents containing active bromine are suggested. The use of inorganic or organic chlorine compounds in washing agents for disinfecting purposes is known. Additions of considerable quantities of substances liberating active chlorine are necessary for effective disinfection. It has now been found that in sodium-para-toluelene sulfonbromide, bromine has a better bactericidal activity than chlorine. Fatty acid salts and surface active synthetic foaming and wetting agents of all kinds can be used as detergents with an addition of a small amount of bromamine. British patent 763,383, H. Wallrath and Dr. J. Ellendorf & Co., Wuppertal-Barmen, Germany.

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Products and PROCESSES

High Gloss Polish

A solvent free bright drying polish consists of an aqueous emulsion of an ester wax. The ester wax is the reaction product of oxidized montan wax and a polyhydric aliphatic alcohol containing a maximum of six carbon atoms. The wax should have a saponification number of at least 100, be formulated with a nonionic emulsifier and a compound selected from the group consisting of high molecular paraffinic waxes and their air-oxidation products. The composition should have a melting point of at least 65°C. One such emulsion contains wax, eight parts; air oxidized microcrystalline wax, 3.5 parts; adduction products of ethylene oxide, 2.1 parts; triethanolamine, 0.03 parts; and water, 86.37 parts. U.S. patent 2,782,124; 1957, Guido von Rosenberg and Wilhelm Sauer, Farbwerke Hoechst, A.G., Germany.

★

Rug Soil Retardent

A dispersion of aluminum phosphate or a mixture of aluminum phosphate with aluminum oxide or silica can be used as a soil retardent for application on pile carpeting or other fabrics. An example calls for a spray containing a dispersion of $Na_3PO_4 \cdot 12H_2O$, 0.25 parts; "Carbowax," 0.25 parts and 98.75 parts of salt-free water. U. S. patent No. 2,786,787, Patrick Florio to Mohasco Industries, Inc.

★

Metasilicate Detergent

An alkyl sulfate metasilicate detergent is made by reacting dodecyl and other fatty alcohols and castor oil with concentrated sulfuric acid to form sulfates and sulfonates. Neutralization with sodium metasilicate and base, followed by drying, results in a white, semicrystalline water-soluble powder which contains sodium alkyl (dodecyl) sulfate, 12 per cent; sodium sulforicinoleate, eight per cent; and sodium metasilicate, 80 per cent. Millan Soriana, Spanish patent No. 228,919, 1956, through *Chem. Abstracts*, Vol. 51, p. 8460.

★

Syndets in Waste

Disposal problems presented by synthetic detergents are closely linked to the branching of alkyl chains in the molecule and to the length of the alkyl or polyethoxy chain. These are the primary factors affecting the biochemical oxidation of surfactants. Dodecylbenzenesulfonate and kerylbenzenesulfonate are readily oxidized by activated sludge, while the branched tetrapropenebenzensulfonate is highly resistant. A serious problem arises from the increased use of the latter compound which is known to have a half-life of 16 days in river water.

Oxidizability of polyethoxy esters decreases when the number of ethoxy groups is greater than five. This is believed to be due to lower diffusion rate. Alkyl sulfates, sulfonated fatty acid amides and esters, and esters of low-molecular polyethoxyethylene glycols are readily oxidized. R. H. Bogan and C. N. Sawyer, Univ. of Washington, *Proc. Ind. Waste Conf.*, 1955, 231-43, 1956, through *Chem. Abstracts*, Vol. 51, p. 8339.

★

New P&S Folder

A new paper-bound folder "On the Reaction of Acetophenone with Formaldehyde," recently was published by Polak & Schwarz, Inc., Hilversum, Holland. Fully illustrated with charts and diagrams, the eight-page folder was written by L. G. Heeringa and M. G. J. Beets of the firm's research department. Copies of the booklet may be obtained from the company.

★

Better Surface Cleaner

Sodium metasilicate is more effective than caustic soda in removing soil from hard surfaces. This superior soil removal is believed to be due to the fact that silicate is adsorbed on the surface, presumably physically in the case of glass and probably chemically in the case of metals. The layer of adsorbed silicate helps to displace any adsorbed layer of polar fatty material from the hard surface and prevents subsequent redeposition of the fatty soil. M. Camp and J. P. Parke, Unilever, Ltd., Port Sunlight, England, *Ind. Chemist*, 33, No. 384, 83-86, 1957.

★

Corrosion Inhibitor Data

A new six-page illustrated folder printed in color describing an improved corrosion inhibitor for closed circulating water systems was published recently by Hagan Chemicals & Controls, Inc., Hagan Building, Pittsburgh 30, Pa. Corrosion inhibitor "CS" is suggested for use in air conditioning systems, in automotive cooling systems with or without antifreeze, and in a number of other applications. Copies of the folder may be obtained by writing to Hagan.

★

New Magnus Bulletin

The role of scientific control in manufacture of essential oils, aromatic chemicals and related specialties is described in the June issue of *The House of Magnus*, company publication of Magnus, Mabee & Reynard, Inc., New York. Fully illustrated, the two-color bulletin also contains complete information on the firm's international division, including the names and addresses of representatives in 31 foreign countries. Copies of the bulletin may be obtained from the company, 16 Desbrosses St., New York 13.

★

New Surfactant Bulletin

A new bulletin describing "Sulfonate OS," an anionic surface active agent, was issued recently by Sun Oil Co., Philadelphia 3. The product is used in the manufacture of oil soluble rust and corrosion inhibitors and emulsifying, wetting and dispersing agents. Copies of bulletin No. 51 are available.

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PRODUCTION Clinic

By E. G. Thomssen, Ph. D.

INFLATIONARY trends and an unstable world situation combine to make advance planning of production an arduous and complex task. The world has become so small that a political disturbance in a remote corner of the globe will affect certain commodities overnight. Major war scares have become periodically recurring events which may invalidate all calculations at a moment's notice. The slightest presidential indisposition sends every market into a flutter not only in this country but all over the world. Modern communications have eliminated the time element which formerly served as a cushion between an event and its international repercussions.

In this welter of complicating factors the inflationary spiral is no doubt the element with which the production man is most immediately concerned. Labor costs and raw material prices are constantly rising and to plan ahead so that a reasonable profit margin is maintained becomes correspondingly more difficult. However, for the smooth running of production planning is essential.

We have all become familiar with the phenomenon of business volume rising with profits going down. Rising demands by labor are one of the main springs of this unhappy situation. Although the proportion of labor costs to total tonnage is smaller in the chemical specialties field than in many other industries, it is indirectly and often heavily affected by the cost of raw materials, packages, and machinery upon which it must depend. The inflationary trend receives its impetus not only from frequent and substantial wage increases. Other provisions, such as productivity premiums, fringe benefits, and higher rates for overtime are written into the labor contract.

Dr. E. G. Thomssen

The manufacturer, on the other hand, hesitates to raise his prices in order to absorb these additional costs, especially in competitive fields, such as the chemical specialties or soap business. He is afraid that a price increase will reduce his sales volume because his customers will reduce their inventories rather than buy at higher prices because they, in turn, are ridden by the same fear.

A new and all-time high was recently reached by the consumer price index, which jumped to 118.9 from the 1947-1948 level of 100. In many industries this means additional wage increases, because contracts are tied to cost-of-living by an escalator clause. Though small compared with other raises, this item is usually added to the product's sales price rather than be absorbed by the manufacturer.

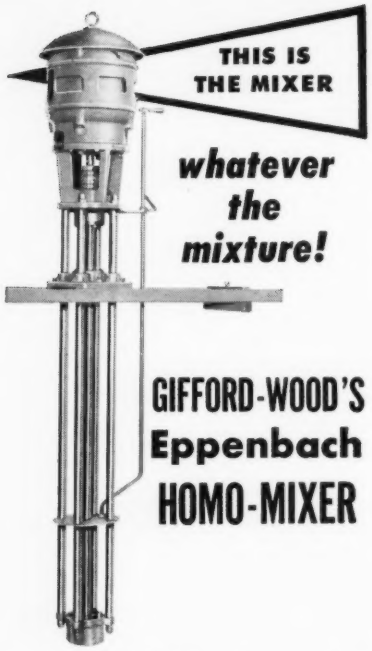
The annual production improvement factor is a provision estimated to add two and a half to three per cent to the annual combined labor bill of all industries in this country. This percentage may mean an automatic wage raise ranging from three to 10 cents per hour. Combined with the cost of living factor, this provision may add as much as 15 cents to the hourly wage leading to a very substantial inflation of the pay roll. The increased labor cost is most likely added to the selling price of the product and is in turn passed on to the consumer who, if he is a workman, asks for higher wages to meet the higher price. Then, as costs go up again, the whole vicious cycle is repeated.

Another expensive item are fringe benefits, which may cost the company as much as 50 cents an hour. More and more of these are being demanded and are likely to add to consumer prices.

Unions are currently pressing for shorter working hours without loss of take home pay. Attempts to legislate a 30 hour week go back as far as the 1930's. Currently proposed alternatives include a 32 hour working week, periodic three day weekends, more holidays, and longer vacations. While these proposals are no doubt attractive to labor, their acceptance would probably lead to further inflationary developments.

An interesting illustration of prevailing trends comes from a prominent manufacturer of machinery and equipment used in the chemical processing industries. According to this report, wages have risen 182 per cent since 1941, raw materials have advanced 161 per cent. Yet the price of the company's machinery has risen only 102.9 per cent in the same period. Wages have risen at a rate much faster and higher than the price of the firm's product, which is a high tribute to the work of production men who kept costs down in the face of great difficulties.

How can the vicious cycle of rising costs and rising wages be broken? Labor may possibly realize that the upward spiral does not operate to its advantage. Wage incentive plans and increased productivity make only minor contributions to reduction in costs. Automation does absorb some of the increased costs in certain fields. Improvement of tools and equipment may provide at least a partial answer by enabling workers to pro-



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* * *

Small Oil Can

GRIDWOOD & ALLEN, INC., New York, recently introduced a small oil can designed for lubrication of surfaces not accessible to regular oil cans. The oil flows through a hollow needle in the spout of the device, which is trade named "Lubristyl."

* * *

Corrosion-Proof Pump

A NEW pump, designed to handle corrosive liquids and slurries containing up to 70 per cent solids, has been developed by Cooper Alloy Co., Hillside, N. J. The pump features a vacuum suction arrangement which sucks the liquid or slurry into a U shaped stainless steel housing with a flexible liner attached to a rotating wheel. As the wheel moves forward the liquid is sucked into the device and as the wheel moves on it is discharged. No stuffing boxes or shaft seals are required. The pump has a capacity of 20 gallons per minute and is said to give an even and continuous flow. The housings and liners are easily exchanged. Liners come in six different materials.

★

IPE Mixer Brochure

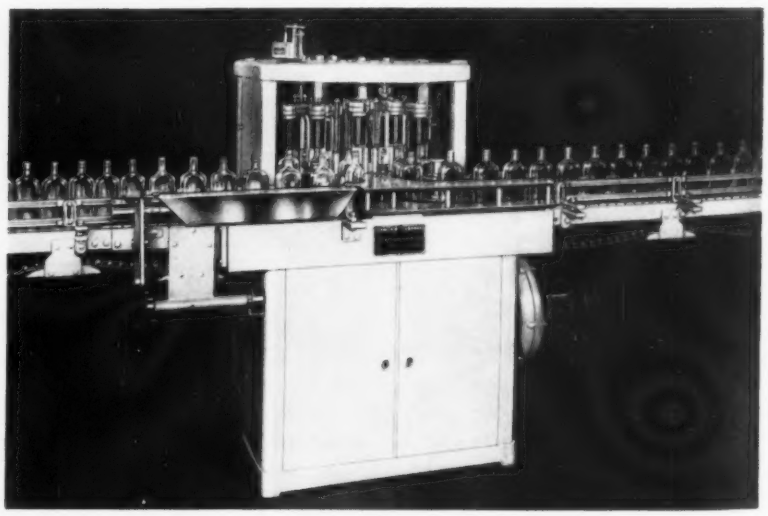
A new line of side-entering agitators is described in an eight-page illustrated brochure published last month by Industrial Process Engineers, 8 Lister Avenue, Newark 5, N. J. Simplicity in design, tapered roller bearings, readily accessible stuffing box which can be repacked without emptying vessel, separate flange-mounted motor and spiral gear drive, and economy in space, are among the features built into these side entering mixers. The booklet lists standard sizes and dimensions and outlines supplementary information supplied with each installation on an individual basis.

★

New Air Bottle Cleaner

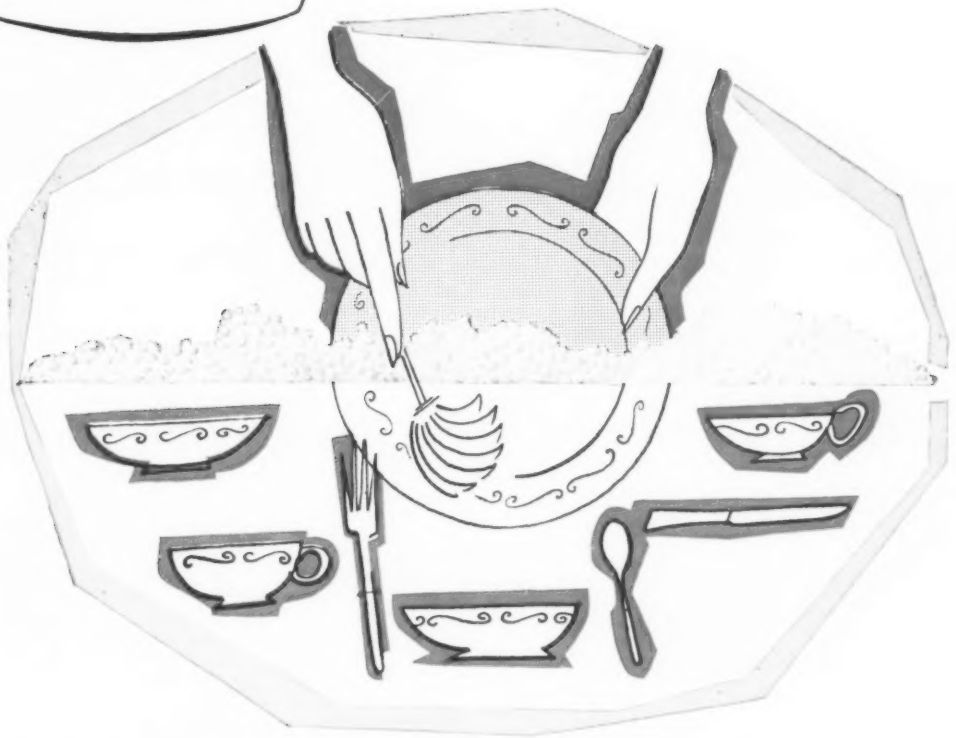
U.S. Bottlers Machinery Co., Chicago, recently announced a new high speed air bottle cleaner with a capacity of up to 250 bottles per minute. Called "DS-12 Sanitar," the machine has 12 duplex heads designed with positive locking bayonet type clamping bell for quick changeover for bottles or jars up to four inches in diameter. The machine inverts the container before the air-tube enters and remains inverted after the air-tube is withdrawn.

New air bottle cleaner by U. S. Bottlers Machinery Co.



Chemicals by

Marchon



EMPILAN LP 2

foam booster and stabiliser

Empilan LP 2 is a new and economic additive for liquid detergents with particular affinities for the popular anionic types. Its presence synergistically boosts detergency and increases fat emulsifying power, thus permitting the formulation of highly concentrated detergent products. The imparting of a pleasant 'soft' feeling to anionic liquid detergent, and a gearing of foaming power to cleaning power, are among other desirable features of this new addition to the comprehensive range of chemicals by Marchon.

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SOAP PLANT Observer

By John W. McCutcheon

REPORTS on the oil, fat and detergent industries of Australia and Japan have become available recently. A paper entitled "Synthetic Detergent Industry in Australia," by P. H. A. Strasser, appeared in the *Proceedings of the Royal Australian Chemical Institute*, volume 24, II, 1957. The writer is indebted to Mr. Strasser for a copy of his presentation.

The detergent industry got off to a slow start in Australia because the soap maker's raw materials are domestically available at a low price, whereas the raw materials for synthetic detergents had to be largely imported. Moreover, the large urban centers enjoy very soft water.

Alcohol sulfates were available in Australia even before World War II, but it was not until 1952 that the first plant for the sulfonation of alkyl aryl benzene went on stream. The current upward trend in synthetics started at that time. In 1956 synthetics accounted for approximately 13 per cent of the total Australian soap and detergent industry. Alkyl benzenes are currently being imported but the steady growth of petroleum refining operations may soon make the syndet industry independent from overseas supplies. Phosphates of all types and in any quantity are available in the Australian market.

Research activities are largely devoted to the adaptation of foreign developments, including work on liquid heavy duty products and sugar-fat derived detergents.

In Japan synthetics hold a smaller share of the total market than in Australia, according to statistics on the oil and detergent industries compiled by the Nikon Yushi Co. Syndets account for approximately seven per cent of all soaps and detergents produced. Unlike Australia, Japan makes its soap largely from imported tallow. Most of the synthetics are based on sperm oil derivatives. Actually most of the Japanese sperm oil production is consumed by the detergent industry.

The 1956 soap production showed the following pattern: toilet bars, 20 per cent; laundry bars, 60 per cent; powders, 15 per cent; industrial and textile soaps, four per cent; other soaps, one per cent. This pattern is reminiscent of the United States production figures in 1930, when laundry bars represented about 50 per cent of the entire American soap production.

Japanese soap statistics give little clue on which one might base an evaluation of the growth potentials of the detergent industry.

* * *

MANY methods have been tried to make soap in a form suitable to be finished in booklets and carried in purse or pocket. The subject has been extensively covered in the April issue of *Soap & Chemical Specialties* in an article entitled "Soap Sheets," by Henry Goldschmiedt. This article mentions what is probably the best method of using a film forming polyvinyl alcohol in combination with soap. However, the film forming compound can be used without soap to make a water soluble pouch of considerable tensile strength. The material has good stretch and recovery, can be heat sealed at about 250° F. and is readily soluble in both hot and cold water. The product packed in the pouch should be non-hygroscopic.

If used to package unit size amounts of detergents for laundry use, the pouch with contents could be dropped into the washer. Another application for such bags would be in the dye industry. Their use would answer the problem how to empty small containers of dye without spreading some of their contents over hands, into the air, etc. The film has not yet been passed as edible and can therefore not be used for unit packaging of food.

Samples of water-soluble polyvinyl plastic bags have been received by the writer from Mono-Sol-Corp., 300 West Adams Street, Chicago 6. In sheet form, 0.0015 inch thick, the material costs $1.60 a pound, in five ton lots or more. With 11.2 square yards weighing one pound, the price of one 2½ by four inch bag would be about a quarter of a cent. Descriptive literature and specifications on this disposable packaging medium are available from the manufacturer.

* * *

IN summarizing the most important points to be observed by the chief chemist responsible for quality control we would place the systematic recording of results at the top of the list. The prime importance of such records was pointed out in last month's column.

Secondly, a full description of analyses should be available on paper to serve as a guide to the technician or analytical chemist, as a quick reference if the method is questioned, and finally as a basis for improvements of the method.

The framework of analysis should be independent of the chief

Perfumer's Notes

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ISO-BUTYL FURYL PROPIONATE — A top note of freshness and fine aroma for perfumes. Also used in flavors as an addition to Pineapple, because of its characteristic aroma and freshness.

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chemist as an individual. In many instances the method of choice may be a standard test without modification. For example, free fatty acid may be determined by the method set up by the American Oil Chemists' Society in which case the reference would simply be A.O.C.S.—Ca5a—40. However, the method of choice will frequently be an adaptation of a standard test. Special short cuts and equipment will be used to answer special requirements. Such modifications must be permanently recorded.

The duties of the chief chemist are bound to vary widely. Assuming, however, that he were permitted to carry out his work without interference we would consider the following formula to represent a fair division of his time:

	Per Cent
1) Actual supervision of staff carrying out analyses	40
2) Inspection and supervision of outgoing reports	20
3) Review of methods used, recording and development or adaptation of new methods	10
4) Study of literature, including new equipment brochures	10
5) Discussion of samples and analyses with department heads	10
6) Time for management conferences	10
	100

VAPOR RECOVERY SYSTEM CO., Compton Calif., offers bulletin CP-3030, which describes and illustrates the firm's line of "Varec" liquid level controls, designed to aid the automation engineer in setting up an automatic tank switching system. The variety of controls available in this line is quite extensive.

A BULLETIN describing "Monamine 3-89" fatty acid amide condensate was published recently by Mona Industries, Inc., Paterson 4, N. J. Intended as a thickening and dispersing agent for liquid shampoos and soaps the product is a 98 to 99 per cent active brown paste with a pH of 10. An addition of one per cent "Monamine 3-89" is suggested. Other applications are cleaning preparations, lubricants, cosmetics and other specialties.

Glycerine Yield

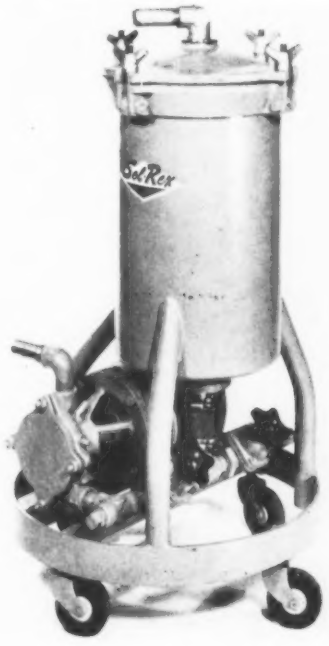
(*From Page* 135)

feed to the first effect evaporator. Pressures in steam chests and separators are indicated by four gauges.

Liquor feed containing 12 per cent glycerine is pumped from storage tanks through a preheater which heats the liquor before it enters the first effect. Preheating increases the capacity of the evaporator. The liquor flows upward through the evaporator tubes at high velocity, absorbing heat from seven to 10 P.S.I.G. steam in the steam chest.

New Sel-Rex Filter

A new, portable liquid filter, designed so that the pump also may be utilized for solution transfer, was announced recently by Sel-Rex Corp., Nutley, N. J. Designated model BS-3, the unit is three feet high, requires one and one-half square feet of floor space, has a capacity of 800 gallons per hour, and is available in stainless steel or iron construction. The mesh filtering unit, also of stainless steel, is attached to the tank cover and lifts out for cleaning.



Condensate from the first effect steam chest is used to operate the preheater. This utilizes latent heat that would be lost if the condensate were flashed to atmospheric pressure. The condensate is returned to the boiler feed system, thereby obtaining the maximum steam economy.

The hot vapor from the first effect is used as the heating medium in the steam chest of the second effect evaporator. Partly concentrated liquor is transferred from the first effect to the liquor side of the second effect where a higher vacuum is maintained. Boiling point of the liquor is reduced and further evaporation takes place. The concentrated liquor, containing 60 per cent glycerine, is continuously pumped from the second effect. Vapor from the second effect separator is condensed in a barometric condenser. The hot water from the condenser is discharged through a tail pipe and is pumped to a forced draft cooling tower. Here the water is cooled for re-use in the barometric condenser.

An exceptionally high recovery of liquor is obtained through the combination of well-balanced design and built-in demisters used in the separator bodies.

The 60 per cent glycerine taken from the evaporator is given an acid treatment to separate traces of residual fats, a lime treatment to neutralize the acid, and is then filter pressed to remove lime and other impurities. The final product, 90 per cent glycerine, is produced by further evaporation.

★

New Heckathorn Folder

A new wallet-size folder listing agricultural chemical spray tolerances was issued recently by United-Heckathorn, 600 South Fourth St., Richmond, Calif. The booklet also contains other pertinent data about chemical sprays, including proper application on various crops. The folder is based upon information provided by the U.S. Department of Agriculture.

PQ SILICATES

Modern Builders

FOR SYNTHETIC DETERGENTS

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Today, silicates of soda are the choice builders for the synthetics. Look into these special advantages; whiter, brighter, cleaner washables because soluble silica in PQ silicates excels as a deflocculant and then serves to prevent the re-deposition of removed soil. Other plus values from the use of PQ silicates as builders are (1) the control of corrosiveness of most synthetic detergent mixtures and (2) a lower cost.

Yes, PQ silicates have proved themselves as effective materials for improving the modern detergents, from deflocculating power to free rinsing properties. There is a PQ soluble silicate to fit all detergents—liquid, paste or dry. Let us discuss how PQ silicates can help you.

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News...

PEOPLE · PRODUCTS · PLANTS

TGMA Elects Fairbanks

* * *

Shaw Bon Ami Ad Mgr.

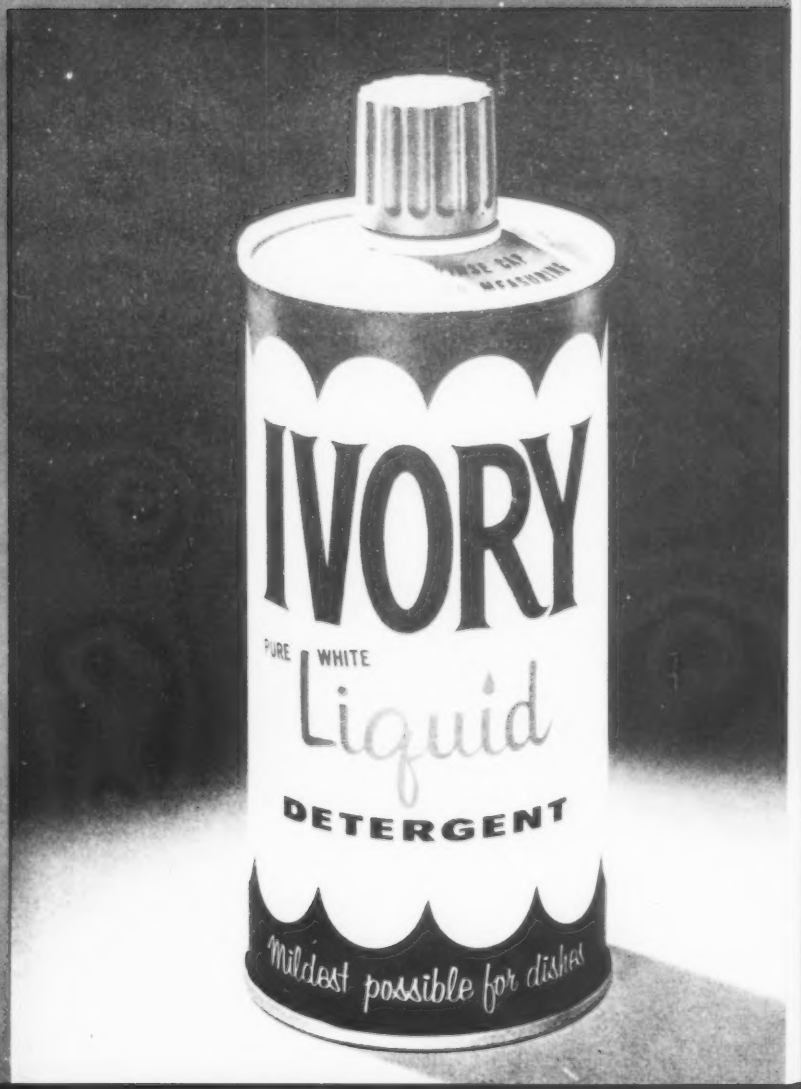
* * *

Honorary Degree to Breck

* * *

Haude Heads Grace Chem.

"Ivory" liquid dish washing detergent has just been added to the detergent line of Procter & Gamble Co., Cincinnati. Lithographed can, with plastic cap and pour spout, closely resembles label design of soap wrapper for P&G's famous white floating soap. Traditional blue and white color scheme has been kept for can in three sizes.



The Maya Line

provides character and continuity to an entire line of products,

Stable, economical and versatile, the Mayas are invaluable in maintaining a given fragrance throughout a line or related products such as a cream, cologne, powder, rouge, soap, etc.

The Mayas include such favorites as our Maya Fougere 4650 and our Maya Millefleurs 4707, a variety of fine Parisian bouquets, and a full line of fresh floral odors.

Write us about your products and we will be glad to offer suggestions and further details.

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News

Bon Ami Appoints Shaw

John J. Shaw has been appointed advertising manager of Bon Ami Co., New York, it was

John J. Shaw

announced recently by Harry S. Adams, executive vice-president. Mr. Shaw also serves as sales promotion manager. He joined Bon Ami in that capacity in September of last year. Previously he had served for nine years as sales promotion manager of Durkee Famous Foods, Elmhurst, N. Y.

★

Babbitt Names Guffey

B. T. Babbitt, Inc., New York, has appointed Clay Guffey to call on the sanitary supply jobbing trade in southern Florida, it was announced recently by Robert L. Kob, sales manager of Babbitt's institutional and industrial division.

Mr. Guffey will cover the southern part of the state from West Palm Beach south to Miami. He will headquarter at 18320 N. W. 29 Court, Opa-Locka, Fla.

★

New Oakite Detergent

A new liquid detergent designed for use in self-generating steam cleaning equipment and solution lifting steam guns, was introduced recently by Oakite Products, Inc., New York. Called "Oakite LSD," the product is said to reduce clogging and to provide soil removal at concentrations of one to two ounces per gallon of water. If used as recommended, the new detergent may be applied to steel, brass, magnesium and painted surfaces.

★

Colgate Names Hayman

Walton E. Hayman has been named south-central regional manager of the household products division of Colgate-Palmolive Co., New York, it was announced recently by William T. Miller, division vice-president and general manager. In his new post, Mr. Hayman will be in charge of soap and detergent sales in Missouri, Kansas, Oklahoma, Texas, Nebraska, Colorado, Iowa and parts of Wyoming and South Dakota.

★

El Dorado Names Wilson

El Dorado Division of Foremost Food and Chemical Co., Oakland, Calif., has appointed N. S. Wilson & Sons, Boston, as its exclusive sales representative in Maine, Vermont, New Hampshire and Massachusetts. Wilson will handle El Dorado's complete line of coconut oil fatty acids, methyl esters and related products.

P&G Best Run Firm Says Competitive Soaper

Procter & Gamble Co., Cincinnati, is America's best run industrial corporation, according to Cyril G. Fox, president of Fels & Co., Philadelphia. On a recent visit to Buffalo, N. Y., Mr. Fox, who is the first nonmember of the Fels family to head the 91-year-old concern, described the soap business as "the most viciously-competitive, dog-eat-dog business in the world."

He said that although "they give us fits and tear us to pieces, it is an inspiration to watch P&G work. You know you're in the ring with a champ," he added, "but staying in there with them shows we're pretty good, too."

Heads Canadian Witco

William Wishnick, executive vice-president of Witco Chemical Co., New York, has been named

William Wishnick

president and treasurer of the newly-formed Witco Chemical Co., Ltd., Toronto. Mr. Wishnick joined Witco in 1942 at the firm's Lawrenceville, Ill., plant. He later was transferred to sales and in 1951 was elected treasurer. He became vice-president in 1953 and executive vice-president in 1955. Other officers of the new concern include S. M. Freeman, executive vice-president and H. B. Seligman, vice-president.

According to Mr. Wishnick, the new firm will manufacture basic chemicals for the detergent, plastic, paint and rubber industries. Construction of a new manufacturing plant on a six-acre site at Trafalgar Township, Ont., southwest of Toronto, will begin shortly, he added.

★

Tidy House Names Church

William M. Church has been named vice-president of marketing of Tidy House Products Co., Shenandoah, Ia., it was announced recently by J. C. Rapp, president. Mr. Church formerly was sales director. He will be succeeded in that post by Arthur R. Thompson, previously national accounts manager.

shampoos...

dishwashing detergents...

floor cleaners...

NOPCO HYONICS

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THE HYONIC PE SERIES

100% active nonionic ethylene condensates

SUGGESTED USES:

Automatic laundry and dishwashing detergents, car wash powders, wall and floor cleaners, dairy detergent powders, antiseptic sanitizing detergents, dairy milkstone removers.

THE HYONIC FA SERIES

A group of alkylolamide derivatives (Of these, FA 20 and FA 40 are 100% active; FA 75 is 70% active)

SUGGESTED USES:

Dairy cleaners, household degreasers, wax emulsions, floor cleaners, liquid steam cleaners, bottle washing compounds, rug shampoos, window cleaners, bar glass cleaners, liquid scouring concentrates.

HYONIC FS

100% active lauric acid alkylolamide condensate

SUGGESTED USES:

Shampoos, bubble baths, cosmetics, liquid dishwashers.

Superior foam stabilizer for anionics. Excellent detergent and wetter, and shows remarkable detergency synergism when blended with anionics or nonionics.

Almost any property you want for your household or industrial detergent is yours with the Nopco Hyonics. Never was it so easy to tailor your product to your exact performance and sales needs. At competitive costs too! Nopco technical men will gladly work with you to help you produce detergents to your own specifications. Write today for complete data on Nopco Hyonics. Nopco Chemical Company, Harrison, New Jersey.

NOPCO

PLANTS: Harrison, N. J.
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London, Canada

Mr. Church will be responsible for marketing, field sales, advertising, sales promotion and market research of Tidy's complete line of cleaning products, which include "Shina Dish" dishwashing detergent, "Dexol" powder bleach and "GlossTex" starch. Before joining Tidy House, he held marketing positions with S.O.S. Co. and Paul S. Beich Co.

Mr. Thompson joined Tidy House in May, 1953. He previously had served in sales capacities with Lever Brothers Co., New York, and Consolidated Cosmetics.

★

New Liquid Sanitizer

Development of a new concentrated liquid detergent and deodorant was announced recently by Chemical Products Corp., West Paterson, N. J., manufacturer of industrial sanitizing and cleaning materials. The new sanitizer contains no soap and is said to be effective in acid or alkali medium.

★

Emulsol Names Friedman

Appointment of Sy Friedman as assistant to A. O. Raven, sales manager, was announced recently by Emulsol Chemical Corp., Chicago, a division of Witco Chemical Co., New York. Mr. Friedman will headquarter at the company's main office in Chicago. Prior to joining Emulsol, he was associated with Stauffer Chemical Co., New York, in the research department where he worked on the development of agricultural pesticides.

Sy Friedman

Grace Appoints Haude

Appointment of William J. Haude as president of Grace Chemical Division of W. R. Grace & Co.,

William J. Haude

New York, was announced last month by J. Peter Grace, president. Since May, 1955, Mr. Haude had been vice-president and general manager of Grace Chemical Co., located in Memphis, Tenn. The division is one of the leading producers of ammonia and urea in the U.S.

Before joining Grace in 1953, Mr. Haude was president of Pittsburgh Agricultural Chemical Co., a division of Pittsburgh Coke & Chemical Co., New York. Prior to that he was a vice-president of John Powell & Co., New York.

★

New Jefferson Division

Jefferson Chemical Co., Houston, Tex., has formed a new division to market caustic soda and other alkalis, it was announced recently by J. D. McPherson, vice-president. The new alkali sales division will be headed by William F. Phillips, formerly of American Cyanamid Co., New York.

On July 1, Jefferson took over sales and service of alkalis formerly marketed by Cyanamid. The move was made as a forerunner to production of caustic soda at Jefferson's new chlorine plant at Port Neches, Tex., which is scheduled for completion late in 1958.

Headquarters for the new division will be at Jefferson's New York office. In addition to Mr. Phillips, Joseph F. Hickey and J. Beekman Fish will also join the alkali division. George E. Taylor, who had been serving as a consultant to Cyanamid, will act in the same capacity for Jefferson.

★

Lentheric Ad Campaign

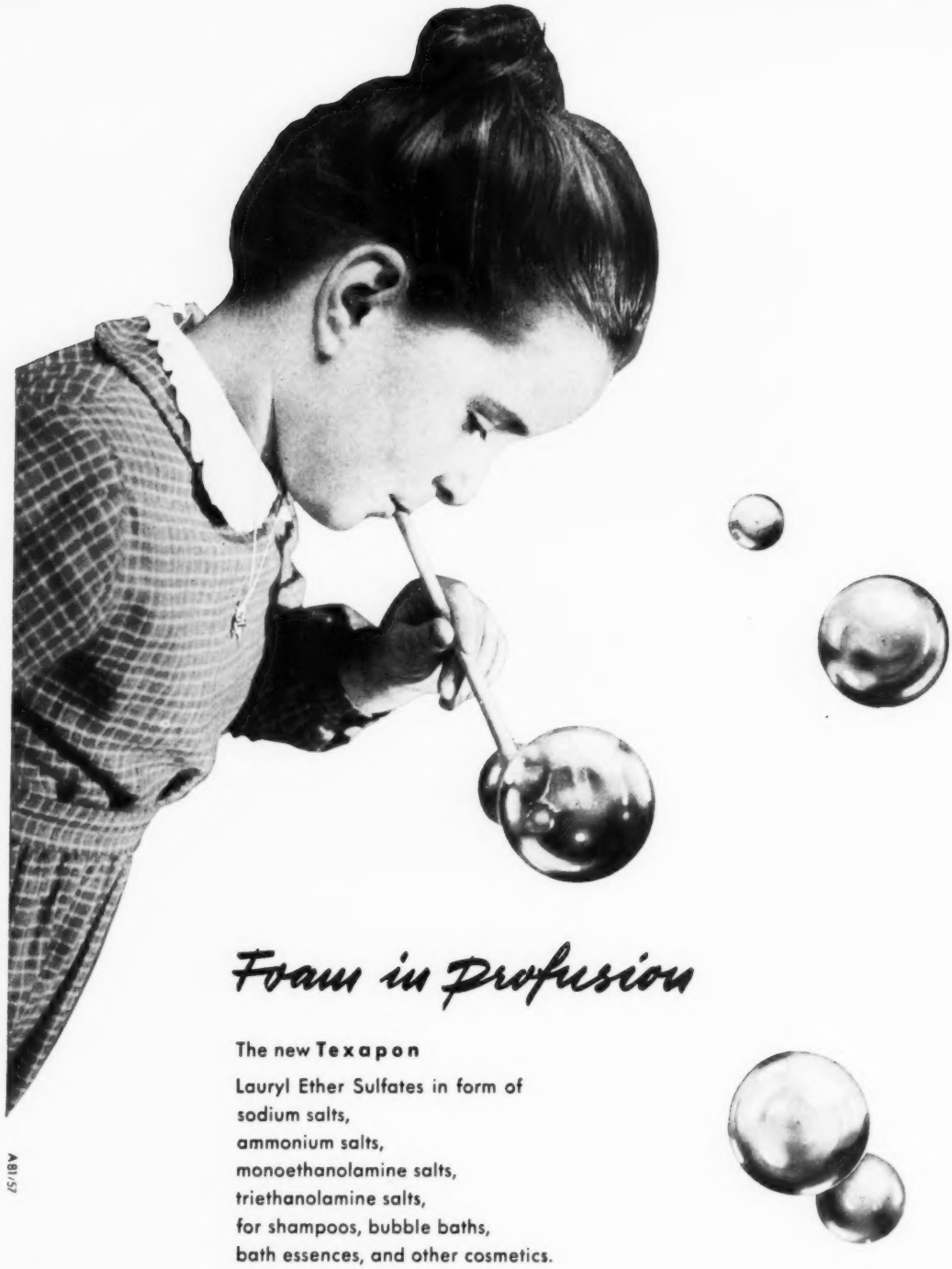
Lentheric Division of Helene Curtis Industries, Inc., Chicago, has begun one of the most comprehensive advertising campaigns in the company's history, it was announced recently. Emphasizing the theme "Fragrance for Better Living," Lentheric will promote its lines of shampoos, hair sprays and perfumes through advertisements in 26 magazines and time spots on four nationally-shown television programs. In addition, the campaign will be backed by advertisements in daily and Sunday newspapers and Sunday supplements throughout the country.

★

Intex Appoints Mason

Appointment of William B. Mason as sales manager for the mid and western division of Intex Chemical Co., Lodi, N. J., was announced recently by Leon P. Brick, president. In his new post, Mr. Mason will be in charge of sales of the division's line of industrial chemicals. He will headquarter in Cleveland. Mr. Mason formerly was Cleveland district sales manager for Onyx Oil & Chemical Co., Jersey City, N. J.

William B. Mason



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The new **Texapon**

Lauryl Ether Sulfates in form of
sodium salts,
ammonium salts,
monoethanolamine salts,
triethanolamine salts,
for shampoos, bubble baths,
bath essences, and other cosmetics.

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Montreal, Que.

Room 709
137 Wellington Street West
Toronto, Ont.

Nat. Aniline Names Two

H. J. Daigneault, vice-president of National Aniline Division of Allied Chemical & Dye Corp., New York, recently announced the appointment of Paul J. Sullivan as resident manager of the Philadelphia sales branch. Mr. Sullivan formerly was manager of detergent sales. He will be succeeded in that post by Leslie C. Wizemann.

Paul J. Sullivan

Leslie C. Wizeman

Mr. Sullivan joined National Aniline in 1951. Prior to that, he served with the textile sales department of Procter & Gamble Co., Cincinnati. Mr. Wizemann will headquarter at the division's New York office and will be responsible to O. M. Morgan, chemical sales director. For the past several years, he has been active in sales development of "Nacconols," National Aniline surface active agents. He joined the company in 1934.

Enjay Appoints Kennedy

James I. Kennedy has been named sales representative in the mid-Atlantic district for Enjay Co., New York, it was announced recently. In his new post, Mr. Kennedy will handle sales of the firm's complete line of alcohols and solvents in Brooklyn and Long Island, N. Y., and lower Connecticut. For the past four years, he had been associated with Dow Chemical Co., Midland, Mich.

★

R&H Wins Patent Suit

Appeal from a lower court decision in a patent infringement suit has been decided in favor of Rohm & Haas Co., Philadelphia, by the United States Court of Appeals for the fourth district. Rohm & Haas had contended that the patent under which it markets its "Dithane" fungicide was infringed by Roberts Chemical Co.

According to D. S. Frederick, R&H vice-president, action in the company's suit on similar grounds against Chemical Insecticide Corp. and one of its dealers, filed in Sepetmber, 1955 and which has been delayed pending the outcome of the Roberts suit, will now be pressed.

★

CD Award to P&G

Procter & Gamble Co., Cincinnati, last month was awarded the Civil Defense industrial and accomplishment pennant from the Ohio Valley Civil Defense Authority. The award was made in recognition of the company's "outstanding support of civil defense in the Cincinnati metropolitan area and its defense readiness."

Presentation was made by Col. J. C. Gault, executive director of OVCDA. Procter & Gamble officials present at the ceremony included J. M. Ewell, vice-president of manufacturing; F. A. Reid, Ivorydale division superintendent; and J. R. Bollman, head of the safety section.

Breck Beauty Survey

One out of four women purchased hair preparations on their last visit to the beauty shop, according to the tenth annual, 1956 survey of beauty shop attendance recently completed by John H. Breck, Inc., Springfield, Mass. Leading products purchased included shampoos, hair maintainers and wave set. The survey also indicated that 82 per cent of all women have one or more hair problems, which in order of importance are manageability, dryness and dandruff. Also reported was a slight rise in the use of hair coloring by women. The survey was conducted among 4,000 subscribers to a nationally known women's magazine. Findings were based on replies from 2,774, or 69 per cent of the subscribers.

★

Receives Safety Award

Cowles Chemical Co., Cleveland, recently received a safety award from the Mutual Liability Insurance Co. of Wisconsin for completing at its Skaneateles Falls, N. Y., plant, one-quarter million man-hours with accident frequency rate less than 50 per cent of the average for the chemical industry.

Presentation was made at a special safety meeting of Cowles production, research and engineering personnel of the Skaneateles Falls unit. John Bates, superintendent, presided at the ceremonies.

Robert F. Huntley, right, president of Cowles, receives the award for outstanding safety accomplishment from William Douque, manager, Mutual Liability Insurance Co. of Wisconsin.

NO TIME FOR SPELLBINDERS!

Extravagant talk . . . idle promises . . . these may still impress some listeners, but for the successful business executive, concrete performance is the thing that counts. *Performance* based upon many years of practical experience in the fragrance field, is what we at FRITZSCHE BROTHERS offer every customer. Each problem submitted us receives the special attention of an expert with whom the manufacturer's specific requirements and limitations (of cost), if any, are first thoroughly discussed. Whatever laboratory work is needed is then carried forward and when all conditions have been satisfied, our recommendations—with samples—are submitted for the customer's evaluation and approval. This procedure applies equally, whether the problem involves high grade perfume or low cost technical odorant. We strive to give the *best performance possible* under the various conditions imposed, and on this basis we invite your patronage.

—ALWAYS DEPENDABLE—
ODORANTS and DEODORANTS
for INDUSTRIAL and
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MADE-TO-ORDER FRAGRANCES
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AROMATIC CHEMICALS,
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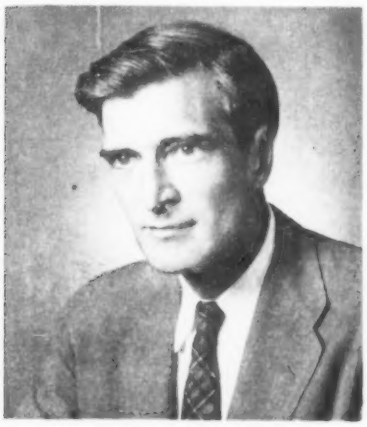
BRANCH OFFICES *and* †STOCKS: *Atlanta, Georgia, Boston, Massachusetts, †Chicago, Illinois, Cincinnati, Ohio, †Los Angeles, California, Philadelphia, Pennsylvania. San Francisco, California, St. Louis, Missouri, Montreal and* †*Toronto, Canada and* †*Mexico, D. F.* FACTORY: *Clifton, N. J.*

Fritzsche Elects Langenau

Edward E. Langenau, director of the analytical laboratory of Fritzsche Brothers, Inc., New York,



Edward E. Langenau

has been elected a vice-president, it was announced recently by the board of directors. Gustave Wohlfort, previously treasurer, has been named secretary-treasurer, while Frederick W. Richter, formerly factory manager of the firm's Clifton, N. J. plant has been named director of the plant and its laboratories.

The board also announced the re-election of John L. Cassullo, president; Frederick H. Leonhardt and H. P. Wesemann, vice-presidents; Ellis Merkl, assistant treasurer; and Arthur J. Hemminger, assistant secretary.

★

Puritan Names Bush

John S. Bush has been appointed national sales training director of Puritan Chemical Co., Atlanta, Ga., it was announced recently by Ted V. Fisher, vice-president of marketing. Mr. Bush formerly served as sales representative in St. Louis. He joined the company in January, 1956.

★

Perfume, Flavor Sales Up

Sales and production of flavor and perfume materials increased slightly in 1956, according to statistics recently released by the United States Tariff Commission. Total output of flavor and perfume products in 1956 totaled 44,000,000 pounds, five per cent more than the 42,000,000 pounds reported in the preceding year. Sales amounted to slightly less than 39,000,000 pounds, valued at $53,000,000. This compares with 36,000,000 pounds, also valued at about $53,000,000, in 1955. Copies of the report may be obtained from the U.S. Tariff Commission, Washington 25, D. C.

★

ADM Appoints Two

Appointment of two technical sales representatives for the chemical products division of Archer-Daniels-Midland Co., Minneapolis, Minn., was announced recently by John D. Hetchler, division sales manager. John K. Lilly has been appointed company representative in Cleveland, Buffalo and Pittsburgh, while Ronald W. Bonatz, has been named representative in Michigan, Indiana and Toledo, O.

Mr. Lilly previously had been associated with Monsanto Chemical Co., St. Louis, where he held several sales supervisory positions. Mr. Bonatz joined ADM in 1955 as a chemist at its Wyandotte, Mich., plant. He previously had held technical positions at Ford Motor Co., and at the University of Michigan's Research Institute.

★

Marketing Group Elects

R. J. Musser of Union Carbide Chemicals Co., New York recently was elected chairman of the Chemical Marketing and Economics Group of the American Chemical Society. S. F. Teague, Monsanto Chemical Co., St. Louis, was made chairman-elect. Other elected officers include Pauline A. Newman, Food Machinery and Chemical Corp., New York, secretary, and C. M. Dosher, Dow Chemical Co., Midland, Mich., treasurer. Appointed to the executive committee were J. Conway, Union Carbide Corp., New York; J. E. Sayre, Barrett Division, Allied Chemical & Dye Corp., New York, and M. J. Curry, Celanese Corp. of America, New York.

MCA Meets, Elects Hart

Ernest Hart, president of Food Machinery and Chemical Corp., New York, was elected board

Ernest Hart

chairman of the Manufacturing Chemists' Association at its 85th annual meeting held last month at the Greenbrier Hotel, White Sulphur Springs, W. Va. Harry B. McClure, vice-president of Union Carbide Chemicals Corp., New York, was elected chairman of the executive committee.

Featured speaker of the meeting was Dr. Leland I. Doan, president of Dow Chemical Co., Midland, Mich., who told the members that "industry, through the millions spent on research, has been responsible for most of the physical progress of our civilization." Dr. Doan added that although many research projects never pay off, the net result of the system benefits everyone—the owners, the employees and the consumers.

Other newly elected officers include R. L. Murray, board chairman, Hooker Electrochemical Co., Niagara Falls, N. Y., vice-president; and D. S. Frederick, vice-president Rohm & Haas Co., Philadelphia, vice-president. Gen. John E. Hull, U.S.A. Ret., and M. F. Crass, Jr., were re-elected president and secretary-treasurer, respectively.

Directors elected for three year terms include Peter Colefax, president American Potash & Chemical Corp.; John T. Connor, president Merck & Co.; Lee V.

ALCOGUM could be the answer... to all of these problems.

ALCOGUM is an extremely effective emulsion or dispersion stabilizer and viscosity controller.

- Can be furnished in various viscosities and concentrations with a pH range from 5 to 12.
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The answer to many fungus control problems—Alco dithiocarbamates and thiuram disulfides.

Our wide experience in tailoring our products to fit your requirements is at your service.

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Dauler, president Neville Chemical Co.; David H. Dawson, vice-president E. I. du Pont de Nemours & Co.; Gen. John E. Hull; Thomas S. Nichols, board chairman, Olin Mathieson Chemical Corp.; Mark E. Putnam, executive vice-president, Dow Chemical Co.; Charles Allen Thomas, president, Monsanto Chemical Co.; R. W. Thomas, vice-president, Phillips Petroleum Co. and George R. Vila, vice-president, United States Rubber Co.

Henry Bower, board chairman of Henry Bower Chemical Manufacturing Co. was elected a director for a two-year term.

Elected directors for a one year term were Curtis W. Cannon, president, Frontier Chemical Co.; and S. B. Penick, Jr., president of S. B. Penick & Co.

★

Joins Helene Curtis

Richard I. Hirsch has been appointed assistant advertising manager of Helene Curtis Industries, Chicago, it was announced recently by Jack K. Lipson, advertising manager. Prior to his appointment, Mr. Hirsch was vice-president of H. M. Gross Co., Chicago advertising agency.

★

"Jet Bon Ami" Promotion

Bon Ami Co., New York, will use five leading women's magazine's for a summer promotion campaign on behalf of its "Jet-Spray Bon Ami." Copy, which will stress the product's proficiency as a waterless household cleaner, will appear in the July and August issues of *American Home, Good Housekeeping, Better Homes and Gardens, McCall's* and *Ladies' Home Journal.* All copy will be headed "Women clean house new way — without water."

★

Oronite Sales Changes

Oronite Chemical Co., San Francisco, recently announced the following changes in its sales division: W. M. Burge, formerly midwestern regional sales manager, has been named west coast sales manager. He will be succeeded as midwestern manager by H. B. Pollock, who will headquarter in Chicago. T. M. Welton, previously Pacific coast regional sales manager, has been transferred to New York as eastern sales manager.

Edward J. Breck, president of John H. Breck, Inc., Springfield, Mass., shows citation recently awarded to him at 54th commencement exercises of St. Michaels College, Winooski, Vt., to his sister M. Constance Breck, treasurer of the concern. Mr. Breck also received an honorary degree of Doctor of Laws at the graduation ceremonies.

★

Fred C. Davis Retires

Fred C. Davis, production manager of the Lockport, N. Y., plant of Cowles Chemical Co., Cleveland, last month announced his retirement after more than 50 years with the company. He is succeeded by N. E. Woonton, recently elected vice-president of manufacturing.

Mr. Davis began his career with Cowles working during school vacations from 1903-'07, when he became regularly employed. In 1930 he succeeded his father, the late F. J. Davis as superintendent and manager of the Lockport plant.

★

du Pont Price Reduction

Price reductions up to 44 per cent on adhesives for "Mylar" polyester film, were announced recently by the industrial finishes division of E. I. du Pont de Nemours & Co., Wilmington, Del. Prices of liquid polyester solutions in drum lots have been reduced from nine to 34 per cent in a range of six types, while solid polymers of four types have been cut from 32 to 44 per cent.

Degree to Edward J. Breck

Edward J. Breck, president of John H. Breck, Inc., Springfield, Mass., has received an honorary degree of Doctor of Laws from St. Michael's College, Winooski, Vt. Presentation was made last month at the school's 54th commencement exercises. The citation presented to Mr. Breck described him as a man who throughout a successful lifetime of manifold business activities, has sought out and assumed responsibilities directed toward the civic and cultural benefit of Springfield, and all of New England.

★

P&G, Canada, Student Aid

Procter & Gamble Co. of Canada, Ltd., Toronto, last month announced that it will offer financial aid, in the form of scholarships, to superior students who might otherwise be unable to continue with their higher education. According to W. E. Williams, president and general manager, the company has set aside $25,000 annually for this purpose.

Mr. Williams said that "it is hoped that this step will not only be beneficial in itself but will encourage other companies to investigate means by which they can help in their own way the cause of Canadian higher education."

Columbia-Southern soda ash has been favored with the trusting confidence of leading American glassmakers since 1899. They find, year after year, that this basic alkali is manufactured with extreme care to conform to their particular requirements. Nor is the glass industry unique in this respect. Columbia-Southern has learned with creative care the varying soda ash needs of producers and processors active in chemicals, cleansers, soap, pulp and paper, textiles, metals, petroleum refining, water treating, leather, enamels, pigments, ceramics and other fields. Couldn't you benefit from this experience, and the resulting superiority of Columbia-Southern's soda ash?

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

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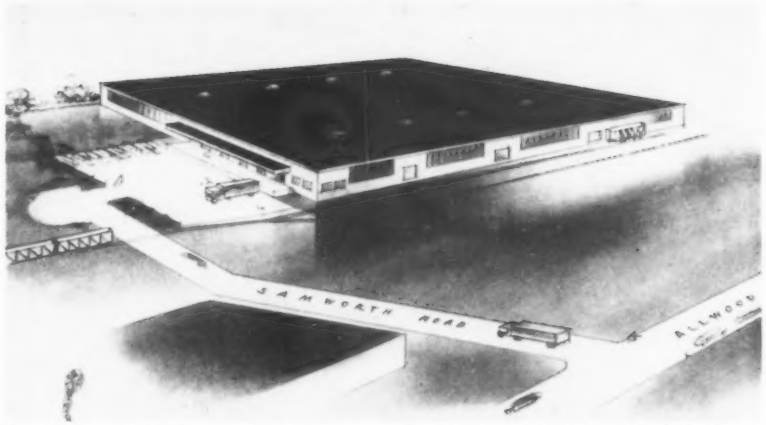
IN CANADA: Standard Chemical Limited and its Commercial Chemicals Division

Lehn & Fink Warehouse

Lehn & Fink Products Corp., New York, recently leased a new one-story, 55,000 square foot warehouse in Clifton, N. J. The building is equipped with the latest warehouse facilities, including fork lift trucks, conveyors and special interior lighting. A unique feature of the structure is that it may be converted into a modern manufacturing plant by removing two inch insulated panels in the upper sections of the walls and replacing them with steel sash and glass, allowing natural light to enter on four sides.



New one-story, 55,000 square foot warehouse recently leased by Lehn & Fink Products Corp., New York, in Clifton, N. J.

★

CSMA Hollywood Meeting

Hotel reservations are now being accepted for the 44th annual meeting of the Chemical Specialties Manufacturers Association to be held at the Hollywood Beach Hotel, Hollywood, Fla., Dec. 9-12, it was announced last month. According to H. W. Hamilton, CSMA secretary, reservations must be made directly through CSMA and not by contacting the hotel. Mr. Hamilton also emphasized that single rooms are at a premium. After they have been allocated, he said assignments for sharing double rooms will be made. Requests for the use of double rooms for single occupancy will not be accepted.

Although the meeting will officially open Monday, Dec. 9, a "get together" is planned for Sunday evening, Dec. 8 at the hotel. The program will conclude Wednesday evening Dec. 12, with departure scheduled for the following day. Reservation applications may be obtained from CSMA, 50 East 41st St., New York 17.

★

New Monsanto Plant

Construction of a new plant for the manufacture of dichloroisocyanuric and trichloroisocyanuric acids was begun last month by Monsanto Chemical Co., St. Louis, at Everett, Mass. The new unit will produce well over a million pounds per year of the two products, according to J. L. Christian, vice president of Monsanto and general manager of its inorganic chemicals division.

Dichloroisocyanuric and trichloroisocyanuric acids will be marketed under Monsanto's trademarks "ACL-70" and "ACL-85," respectively. The plant, believed to be the first of its kind in this country, is expected to be in operation by the fall. The chemicals are utilized in the manufacture of dry household bleaches, commercial laundry bleaches and industrial sanitizing agents.

★

Hollingshead Appoints Ham

John O. Ham has been appointed production manager of the western division of R. M. Hollingshead Corp., Sunnyvale, Calif., it was announced recently. In his new capacity, Mr. Ham will direct manufacture of Hollingshead's line of waxes, cleaners, polishes, hydraulic fluids and corrosion inhibitors. Mr. Ham joined Hollingshead in 1955 in the maintenance department. At the time of his appointment he was foreman of the filling department.

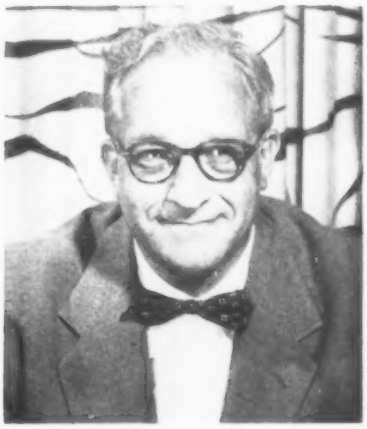
John O. Ham

★

Lipps in New Post

Charles V. Lipps, formerly vice-president of marketing of Simoniz Co., Chicago, has joined the Beach-Nut Foods Division of Beach-Nut Life Savers, Inc., Canajoharie, N. Y., as general sales manager, it was announced recently. At Simoniz, Mr. Lipps was responsible for the company's advertising, sales promotion and market research activities. He had been with Simoniz for seven years. Prior to that, he had served for twenty years in sales management capacities with Kirkman Soap Co. and Carnation Co.

Charles V. Lipps



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Du Pont Methoxychlor

(90% TECHNICAL METHOXYCHLOR OIL CONCENTRATE)

gives knockdown in addition to kill!

Compare!

PEET GRADY TEST DATA—SPACE SPRAYS

	% Flies on Floor					% Dead
	2 min.	4 min.	6 min.	8 min.	10 min.	24 hrs.
OTI	79	94	97	97	96	21
1.00% methoxychlor	16	71	95	97	99	85

71% KD in just 4 minutes proves methoxychlor is much more than a lethal agent alone. Du Pont methoxychlor is one of the least expensive insecticides you can use in many effective combinations. Contact the district office nearest you.

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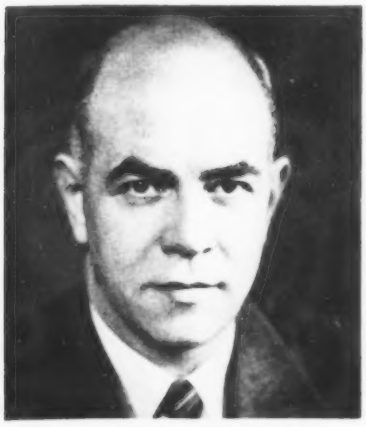
Cleveland 14, Ohio . . . . . 1321 National City Bank Bldg.
Wynnewood (Philadelphia), Pa. . . . . 308 E. Lancaster Avenue
Houston 25, Texas . . . . . 1100 East Holcombe Blvd.

SCI Elects Bowman

William B. Bowman, assistant general manager of the organic chemicals division of Ameri-



William B. Bowman

can Cyanamid Co., New York, has been elected honorary chairman of the American section of the Society of Chemical Industry. Announcement was made last month by Monroe E. Spaght of Shell Oil Co., New York, the section's retiring chairman.

Mr. Bowman joined Cyanamid in 1955. Prior to that, he was associated with Jefferson Chemical Co., Houston, Tex., as market development manager, and Westvaco Chlorine Products Corp., New York.

Other newly-elected officers include: F. J. Emmerich, chairman of the board, Allied Chemical & Dye Corp., New York, honorary vice-chairman John S. Parkinson, research director, building prod-

A. L. van Ameringen

ucts department, Johns Manville research center, Somerville, N. J. honorary treasurer; Robert Heggie, director of research, American Chicle Co., Long Island City, N. Y., honorary controller; Robert Cairns, director of research, Hercules Powder Co., Wilmington, Del., honorary secretary.

Members elected to the executive committee for three year terms are: Lauchlin M. Currie, Union Carbide Nuclear Co., New York; William H. Lycan, Johnson & Johnson, New Brunswick, N. J.; Frank C. McGrew, E. I. du Pont de Nemours & Co., Wilmington, Del.; and Hans Stauffer, Stauffer Chemical Co., New York. W. E. Hanford, M. W. Kellogg Co., New York, was elected to the executive committee for a two year term, and Kenneth H. Klipstein, American Cyanamid, for one year.

★

Diversey Appoints Four

Appointment of four new district managers in its central division, was announced last month by Diversey Corp., Chicago. According to R. E. Perry, general sales manager, the new appointees are Sidney E. Cadieu, Dunbar, Wis.; Kenneth O. Green, Monmouth, Ill.; James P. Raleigh, Overland, Mo.; and Walter C. Rohn, Wilmette, Ill. Each of the new managers is a food sanitation specialist. Mr. Cadieu was the division's top salesman in 1955, while Mr. Rohn won a similar honor last year.

★

Named to Menninger Board

A. L. van Ameringen, chairman of the board of van Ameringen-Haebler, Inc., New York, has been named to the board of governors of the Menninger Foundation, it was announced recently by Dr. William C. Menninger. A former treasurer and member of the executive committee of the National Association for Mental Health, Mr. van Ameringen joins nearly 100 business and professional leaders who are assisting with development of this non-profit psychiatric center. The foundation is devoted entirely to research, professional education, treatment and prevention of mental disorders and is one of the nation's major sources of trained health personnel.

A.R.M. Boyle Retires

A. R. M. Boyle has retired after 32 years as treasurer of Lehn & Fink Products Corp., New York,

A. R. M. Boyle

it was announced last month by Dr. Edward Plaut, president. Mr. Boyle will continue as a member of the board of directors and will act as an advisor on company fiscal matters.

Born in Scotland, Mr. Boyle came to the United States in 1919 after three years in the Canadian Army. He joined Lehn & Fink in 1925 as treasurer and director.

★

Joins Polak & Schwarz

Polak & Schwarz, Inc., New York, recently announced the addition of Edwin P. Hay to its sales staff. Mr. Hay formerly was associated with General Aniline & Film Corp., New York. In his new post,

Edwin P. Hay

SHULTON

BENZYL ACETATE

There is no finer . . . Shulton benzyl acetate, F.F.C., is made to meet the particular requirements of the soap and perfume industries. In addition, Shulton benzyl acetate is also available in Technical grade for applications that permit this economy. Shulton offers an extensive range of benzyl compounds, in U. S. P., N. F., or Technical grades, specially manufactured for soap, perfume, and pharmaceutical uses: benzyl alcohol, benzyl benzoate, benzyl n-butyl ether, benzyl salicylate, and dibenzyl ether. Whatever your benzyl needs, look to Shulton for the finest.

Technical data, samples, and additional information, on request.

SHULTON
FINE CHEMICALS

FINE CHEMICALS DIVISION
SHULTON, INC.
ROCKEFELLER CENTER
NEW YORK

he will handle sales of the company's complete line of essential oils and aromatic chemicals.

—★—

Crabtree in New Post

Robert W. Crabtree has been advanced to the newly created post of manager of chemical sales in the explosives department of Hercules Powder Co., Wilmington, Del., it was announced recently. He had served as the department's nitrogen product sales manager since 1953. With Hercules since 1934, he was sales service representative in Arizona and in San Francisco, became resident manager of explosives in Los Angeles in 1948.

In his new post Mr. Crabtree is responsible for sales not only of nitrogen products but also of methanol and other chemicals.

—★—

New Arkansas Wax Firm

Formation of Arkansas Chemical Co., Malvern, Ark., was announced recently by Carroll Cuffman, president. The new firm will produce montan wax and resins for use in polishes, emulsions, floor waxes and other protective coatings. Raymond L. Drew, one of the first commercial producers of American montana wax, has been named technical director.

—★—

Houghton Plans Expansion

E. F. Houghton & Co., Philadelphia, recently announced an expansion of its Detroit manufacturing facilities that will more than double the plant's size. According to William F. MacDonald, president, present plans call for construction of a new plant adjacent to the firm's present Detroit unit. The new structure will contain factory, laboratory and office facilities and will be served by a rail siding.

Products to be manufactured at the Detroit unit include rust inhibitors, drawing compounds, cutting fluids and related specialties. The plant will be operated under the direction of George P. Wilson, present superintendent. Construction, which began early this month, is scheduled for completion late in 1957.

Walter Wynne to Europe

Walter Wynne, cosmetic chemist of Givaudan-Delawanna, Inc., New York, will leave that city

Walter Wynne

July 21 for a tour of Givaudan plants in Geneva, Paris and London. While in Europe, Mr. Wynne will attend Society of Cosmetic Chemists' seminars to be held in Paris and Geneva in early August.

—★—

TGMA Elects Fairbanks

R. G. Fairbanks, president of Fairbanks Soap Co., Ltd., Toronto, last month was elected president of the Toilet Goods Manufacturers Association, Toronto, at the organization's 29th annual meeting held at Whiteface Inn, Lake Placid, N. Y. Mr. Fairbanks founded his company in 1935 and two years ago introduced "Sweetheart" soap into Canada. Fairbanks, Ltd. is now a subsidiary of Purex Corp., Ltd., South Gate, Calif.

R. G. Fairbanks

—★—

DCAT Panel Discussion

A panel discussion on "An Analytical Look into the Year Ahead in the Drug and Chemical Industries," was feature of a luncheon meeting of the Drug, Chemical and Allied Trades Section of the New York Board of Trade, held at the Hotel Biltmore, New York, June 18. Charles P. Walker, Jr., president of van Ameringen-Haebler, Inc., New York, served as moderator for the panel, which included Glen B. Miller, president of Allied Chemical & Dye Corp., New York, and Dr. J. Mark Hiebert, president of Sterling Drug, Inc., New York.

—★—

Bridgeport Wins Award

Bridgeport Industrial Product, Inc., Bridgeport, Conn., distributor for Lightfoot Schultz Co., New York, last month received the Certificate of Award from the Connecticut Safety Society for the outstanding exhibit in housekeeping aids at the 12th annual Connecticut Industrial Safety Conference. The affair was held at New Haven, June 4 and 5.

—★—

Sonneborn Opens Breth Lab

Research facilities were doubled at the Petrolia, Pa., refinery of L. Sonneborn Sons, Inc., New York, with the official opening of a new laboratory building June 6. Rudolf G. Sonneborn, president of the firm, dedicated the new building to the late Ferdinand W. Breth, technical director of Sonneborn for many years.

The new facilities will extend Sonneborn research efforts in four of the firm's established lines: white mineral oils, petrolatums, microcrystalline waxes, and petroleum sulfonates. The company sees its greatest areas of growth in the fields of laminating waxes and detergent sulfonates and expects to devote much of its research efforts to new product developments in these areas.

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PUBLIC SERVICE ADVERTISING COUNCIL

New Fly Killer

A new fly killer for use in dairy barns, was introduced recently by African Pyrethrum Development, Inc., New York. Said to be harmless to cows and consumers of dairy products, the new pesticide contains pyrethrum and two synergists: piperonylbutoxide and n-octyl bicycloheptene dicarboxcimide. It is available in sprays, wettable powders and emulsions.

★

Dow Price Reduction

Price cuts on all liquid bulk shipments of "Versene" and "Versenol" chelating agents, ranging from one-half to 3½ cents per pound, were announced last month by Dow Chemical Co., Midland, Mich.

"Versene 100" (ethylenediaminetetra-acetic acid, tetrasodium salt solution) has been reduced from 22 to 19 cents per pound in carload quantities. "Versene 67," a less concentrated form of the same solution, has been cut from 18½ to 17 cents, while "Versene Fe-3" liquid, a product used for iron control in textiles, was reduced from 18 to 17 cents per pound.

On these products and on other liquid chelating agents in the Dow line, an additional price reduction of one-half cent per pound is provided in tank car and tank truck quantities.

★

"Hyamine" for Pools

Use of "Hyamine 2389" as an algicide in swimming pools is featured in an article published in the May-June issue of *Rohm & Haas Reporter*, house organ of Rohm & Haas Co., Philadelphia. The product is a quaternary ammonium compound, described as non-corrosive and equally effective in hard and soft water.

One gallon of a 10 per cent solution of "Hyamine 2389" to every 10,000 gallons of pool capacity will kill heavy growths of algae, according to the manufacturer. Where the growth is light, a concentration of only one gallon in 50,000 gallons of water will prevent further growth. Clean water can usually be kept free of algae if a concentration in the ratio of three parts of "Hyamine" (active basis) to a million parts of water is maintained.

The use of "Hyamine" also effects an economy in chlorine requirements, since algae growth causes rapid dissipation of chlorine in the pool.

More concentrated formulations, such as three-quarters of an ounce of a 10 per cent solution of "Hyamine" in a gallon of water, are effective against the microorganism causing athletes foot and are therefore recommended for foot baths and for the mopping of poolside walks and other areas. Slightly more concentrated solutions are suggested as a disinfecting rinse for bathing suits and caps.

★

Hooker Sales Changes

Hooker Electrochemical Co., Niagara Falls, N. Y., recently announced four changes in its sales department. According to John S. Coey, eastern sales manager John M. Moore, formerly product supervisor of "Virgo" salt and "Fluorolube," has been named supervisor of jobber sales for these products. Mr. Moore will be succeeded as product supervisor by Charles A. Strack, who previously had served in the "Virgo" technical service department. Other appointments include Henry R. Morrison as trichlorethylene specialist in the Los Angeles sales office and Matthew S. Bissell as Chicago sales representative.

★

Helen L. Booth Elected

Miss Helen L. Booth, executive secretary of the Drug, Chemical and Allied Trades Section of the New York Board of Trade, Inc., last month was elected to a three-year term as a director of the Trade Association Executives of New York. The organization's annual meeting was held at the Hotel Belmont Plaza, June 19. Associated with DCAT for 29 years, Miss Booth was named its first woman secretary in 1943.

A. Reed Wilson Dies

A. Reed Wilson, 64, president and founder of A. Reed Wilson Co., Kansas City, Mo., sanitary supply house, died May 25 at his home following a heart attack.

Mr. Wilson began a long career in the sanitary supply field shortly after World War I when he joined the Hillyard Chemical Co., St. Joseph, Mo. In 1928 he moved to St. Louis, where he was associated with the Vestal Chemical Co. In November, 1932 he moved to Kansas City where he founded his own firm.

He served as an ensign in the U. S. Navy during World War I and re-entered naval service as a lieutenant commander early in World War II.

★

New Dow Pittsburgh Office

Dow Chemical Co., Midland, Mich., opened a new sales office July 1 at 1 Gateway Center, Pittsburgh. Donald H. Gilmore, formerly supervisor of magnesium sales for the firm's Cleveland branch, has been named head of the new office, which will serve portions of West Virginia, Pennsylvania, Maryland and Ohio.

★

New Corrosion Inhibitor

Armour and Co., Chicago, recently introduced a new corrosion inhibitor for use where sulfuric, sulfamic and phosphoric acids are employed to remove undesirable coatings from metal surfaces. "Inhibitor 2508" is an aliphatic derivative in liquid form, readily dispersible in water, and effective in concentrations as low as 100 to 500 ppm.

★

Wyandotte Names Goss

Edgar G. Goss has been appointed assistant to the manager of industrial organic sales of the Michigan Alkali Division, Wyandotte Chemicals Corp., Wyandotte, Mich. In his new post, Mr. Goss will direct Wyandotte's private label packaged anti-freeze sales. He formerly was a manufacturer's representative in the automotive industry.

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You don't have to with new Wyandotte *Flo-chilled* Anhydrous Caustic Soda. It's free-flowing always.

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Stepan 25 Years Old

Stepan Chemical Co., Chicago detergent and surfactant manufacturer, is 25 years old this month. Alfred C. Stepan, Jr., president of the firm, started the enterprise in 1932 with a line of synthetic hand cleaners for industrial use. Since then, Stepan has become a major supplier of synthetic detergent raw materials.

In 1952, the firm sold its original alkyl aryl sulfonate plant to Continental Oil Co. and purchased a 10-acre tract at 3250 South Kedzie Street, Chicago, where it built a new plant which manufactures lauryl sulfates, liquid detergents, alkyl aryl sulfonates, alkylolamides and other amides.

In 1956, a 300 acre tract was bought near Joliet, Ill., where a new manufacturing unit has recently been completed which makes sulfonates, ethylene oxide condensates, methyl esters, and alkylated phenols.

★

N. Y. Quinine Name Change

New York Quinine & Chemical Works, a wholly-owned subsidiary of S. B. Penick & Co., New York, recently merged with the parent concern and will henceforth be known as a division of Penick. The change was made to simplify corporate structure, according to the announcement.

Dr. Yves-Rene Naves, director of research of L. Givaudan & Cie., S.A., Vernier-Geneva, Switzerland, left the United States recently following a two-week visit. During his stay, he discussed matters of mutual interest with the research and technical staff of Givaudan-Delawanna, Inc.

Ungerer Names Murdock

Appointment of Frank A. Murdock as west coast sales director of Ungerer & Co., New York, was

Frank A. Murdock

announced recently. Mr. Murdock will be in charge of a program to expand customer service in that area. He will headquarter at the firm's Los Angeles office and will be assisted in his duties by George MacDonald, who has been associated with Ungerer for 33 years.

★

Bowen Names Belcher

D. W. Belcher has been named vice-president of Bowen Engineering, Inc., North Branch, N. J., it was announced recently by Ralph T. Reeve, president. Mr. Belcher joined Bowen in 1948 as a functional design engineer. He was made chief engineer in 1954. Prior to joining Bowen, he was associated with E. I. du Pont de Nemours &

D. W. Belcher

The man who rolled his own

Then there was this P. A. of *exceedingly* individual tastes. Couldn't abide ready-to-wear suits. Had his shirts hand-stitched. Even rolled his own cigarettes — couldn't find any packed to his liking.

You could see it coming when we made our first call. "We use only raw materials *exactly* suited to our processes. Not that we don't *like* to save money, you know, but..."

"Of course," we said, fetching up an ambrosial sample, "and we think our ACINTOL* FA — Tall Oil Fatty Acid is tailor-made for your alkyds." He picked up the bottle gingerly. *"Tailor-made?* But, remember, we need excellent color stability." We said, "Couldn't fit better."

He frowned. "But odor is a vital consideration, and naturally we couldn't..." We lifted the lid, he sniffed carefully, then took a last deep breath. "But isn't it —" he blanched —"cheap?" We thought he had us there, but we said, "Well, let's say it's — economical!"

"Young man," he said, "you seem to have a perfect understanding of our particular needs," and signed on the dotted line — not only for ACINTOL* Fatty Acid, but for our ACINTOL* D — Distilled Tall Oil.

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Co., Wilmington, Del., as chemical supervisor.

—★—

In New Borax Post

Election of W. A. Ackerman as secretary of United States Borax & Chemical Corp., Los Angeles, was announced recently by James M. Gerstley, president. Mr. Ackerman, who formerly was assistant secretary, succeeds R. F. Steel, who recently was named assistant general manager. With Borax for more than 10 years, Mr. Ackerman was appointed assistant controller in the insurance department in 1951 and was made assistant secretary last year after Borax merged with United States Potash Co.

—★—

Hooker Names Boyd

Robert B. Boyd has been appointed product manager of organic chemicals of Hooker Electrochemical Co., Niagara Falls, N. Y., it was announced last month by Robert E. Wilkin, vice-president and director of sales. Mr. Boyd

Robert B. Boyd

formerly was sales manager of Oldbury Products Division. He joined Oldbury Electro-Chemical Co. in 1936 as a salesman, became assistant general sales manager in 1951, sales manager in 1955, and sales manager of Oldbury Products late in 1956 when Oldbury Electro-Chemical merged with Hooker.

Other Oldbury personnel assigned to sales positions with Hooker include Fred H. Berggren, product supervisor of chlorate chemicals; Joseph I. Rue, Chicago representative; Charles H. Foster, Philadelphia representative; James T. Whelen, New York district representative; and John W. Johnstone, Jr., who will headquarter at Hooker's Niagara Falls office.

—★—

Pennsalt Dividend

Pennsalt Chemicals Corp., Philadelphia, last month declared a dividend of 40 cents per share on common stock with a par value of $10 per share. Dividends will be payable Sept. 14 to shareholders of record at the close of business Aug. 23.

—★—

Joins Honey Harbour, Ltd.

Daniel G. Lewis has been appointed as advertising director and assistant to the president of Honey Harbour, Ltd., North Hollywood, Calif., it was announced recently by Harvey Hewitt, president. Mr. Lewis will headquarter in the firm's main offices in that city. Honey Harbour manufactures cold water soaps.

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—★—

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AOCS Committee Chairman

A. K. Presnell of Andrew Jergens Co., Cincinnati, has been named general chairman for the American Oil Chemists' Society's 31st annual meeting to be held at the Netherland Hilton Hotel, Cincinnati, Sept. 30 to Oct. 1. Other committee chairmen include: E. W. Eckey, Eckey Research Laboratory, committee not announced; Robert F. Brown, Emery Industries, Inc., hotel; Charles G. Goebel, Emery Industries, Inc., entertainment; Mrs. Doris V. Clark, Du Bois Co., Cincinnati; ladies' entertainment; Frank L. Jackson, Miami Valley Laboratories of Procter & Gamble Co., exhibits; Ronald T. Clause, Procter & Gamble Co., registration; Joseph L. Trauth, Jr., Emery Industries, Inc., finance; Eugene M. Sallee, Emery Industries, Inc., publicity; Charles J. Lohman, Andrew Jergens Co., printing; and Thomas F. Waters, Procter & Gamble Co., inspection trips.

★

New Plant for Heyden

Heyden Newport Chemical Corp., New York, is building a plant at Pensacola, Fla., to produce methyl isopropyl catechol, it was announced last month by Simon Askin, the firm's president. Scheduled for completion in October 1957, the plant will use a process developed by Heyden Newport to make the new chemical for use as an anti-oxidant for vegetable oils, as an intermediate for insecticides and herbicides, and for a number of major applications in the rubber and plastics industries. Projected capacity of the unit is 500,000 pounds of the new turpentine based material.

★

Dragoco Relocates

Dragoco, Inc. has moved its offices to new and expanded quarters at 250 West Broadway, New York, it was announced July 1. The new telephone number is CAnal 6-5813. The firm formerly was located at 432 Fourth Ave., New York. Its administrative offices, laboratories and stockroom will occupy the entire seventh floor of the building, where Dragoco will have facilities for manufacturing and shipping its perfume and flavor specialties.

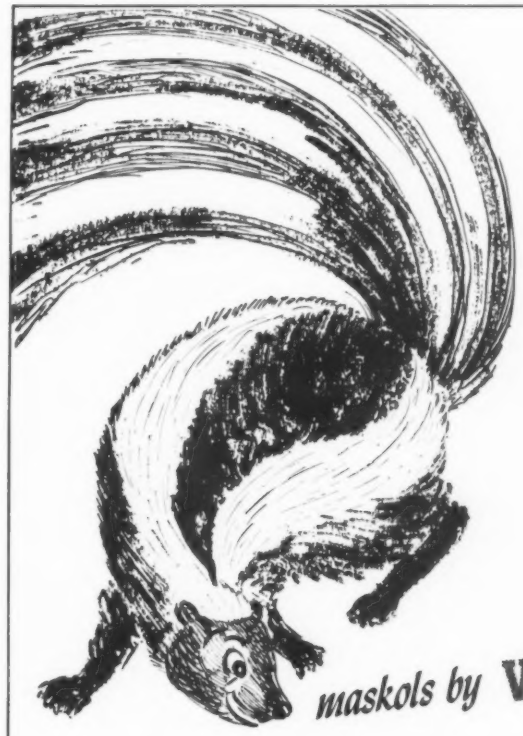
★

New Oronite Texas Office

Oronite Chemical Co., San Francisco, has moved its Texas branch office from Dallas to Houston. The new office is located at 2472 Bolsover Rd. L. G. Oleari will continue as district sales manager.

Glycerine Research Awards

Applications for the sixth annual Glycerine Research Awards are being accepted by the awards committee of the Glycerine Producers' Association, it was announced last month by E. Scott Pattison, association manager. First prize of $1,000 in cash will be presented to the winner at the annual meeting of the Association of American Soap & Glycerine Producers, Inc., next January at the Waldorf-Astoria Hotel, New York.



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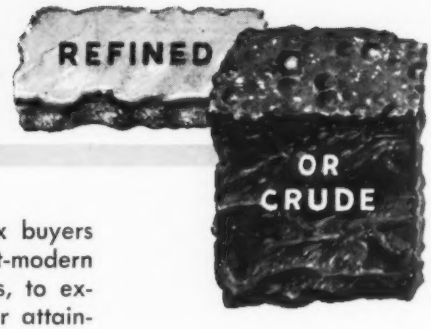

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The awards were established in 1952 to recognize and encourage research leading to new and improved applications of glycerine products and processes. Entry blanks are available from the association, 295 Madison Ave., New York 17.

Fluid Mixing

(*From Page* 133)

5) and the marine square pitch propeller (Fig. 4) are the two basic impeller types currently used in mixing operations. Turbines are the most common pilot plant impellers because most applications involve the scale-up of equipment to turbine type units.

Regardless of the complexity of the process under investigation, which may involve flows of three different phases and other variables, the study must also follow a basic pattern. With all variables constant except impeller speed and diameter a series of basic runs must be made, which measure the effect of horsepower (three to six runs) and effect of the ratio of impeller diameter to tank diameter (one to three runs).

Pilot Run Interpretation

To make these basic runs meaningful the following rules must be observed:

1. Pilot plant impeller must be geometrically similar to the one proposed for full scale installation.

2. Tank proportions must be geometrically similar, with the exception of the ratio of liquid depth to tank depth which need not be kept constant. Corrections for this factor can usually be made.

3. Horsepower must be varied in at least four steps covering at least a ten-fold range. Total speed must thus be approximately two-fold. Wider variations in power are desirable.

4. When gas flow, liquid flow, and other variables are modified, such variations must be at least three-fold between steps so that pronounced differences in process results will be obtained.

The first basic runs are made to establish the relationship between mixer horsepower and process results. This can be determined only if pilot plant impellers and tanks are geometrically similar to projected full scale equipment. If the power characteristics of the pilot plant impeller are known, horsepower can be calculated from speed measurements without use of elaborate dynamometers.

These studies should be carried out and plotted at horsepower levels ranging from zero up to a value sufficient to cause a leveling out of the process result. The slope of the resulting curve permits many preliminary observations which point the way to appropriate follow-up experiments. Information obtained from these runs is illustrated in Fig. 15. The numbered curves are discussed below. The irregular line at the left shows the condition of non-uniformity prevailing in the mixing vessel. Results at this stage depend on the location in the tank from which

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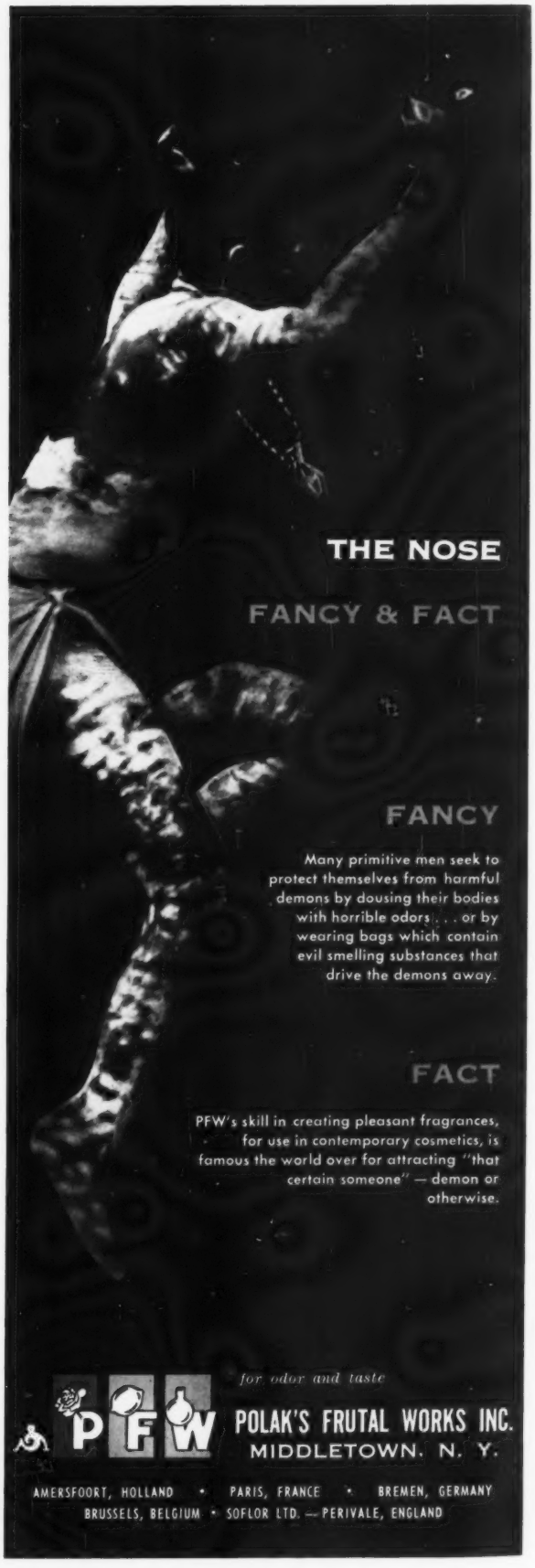
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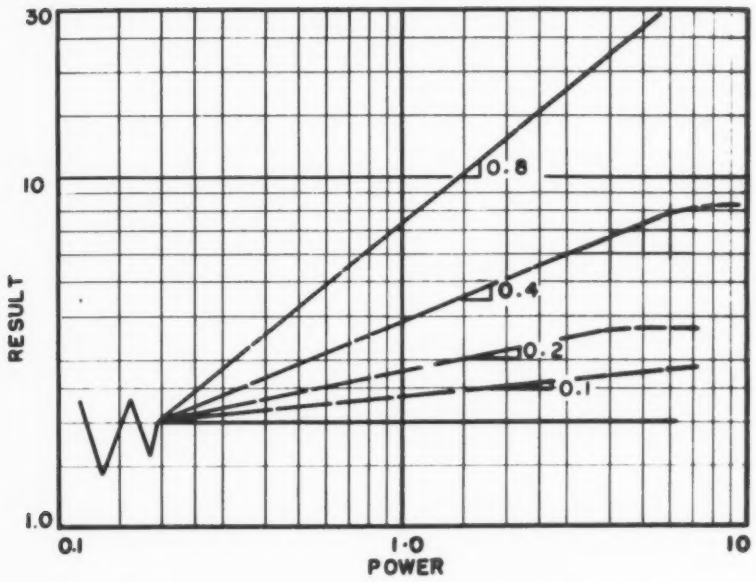

Figure 15. Curves of basic pilot runs at four different horse power levels.

the sample is taken. At point "A" the power level has been reached which is required for uniform blending.

1. At extremely low horsepowers, below the level required for uniform blending, samples taken from various parts of the tank will show extremely wide fluctuations. Once uniformity in blending is reached as determined by samples, no further effort of horsepower variations can be observed. This indicates that a homogeneous chemical reaction is taking place which is governed by the laws of chemical kinetics. From this point all that a mixer can do for the process is maintain uniformity throughout the vessel. No additional pilot plant study is needed since the horsepowers required for uniform blending are quite low, and data on such systems is available.

2. The slope of result versus horsepower on a logarithmic plot is very low, less than 0.1. The action is influenced somewhat by mixing, but not markedly, and is usually influenced principally by the volumetric pumping capacity of the impellers. There is little need for evaluating D/T. Scale up will be influenced by the chemical and physical factors of the process, and the mixer can do little to alter these characteristics.

3. The slope is an intermediate value between 0.1 and 0.2. These processes are usually influenced by impeller flow. A very brief investigation of D/T will confirm whether impeller flow is controlling, and if so, the process can then be designed on the basis of impeller flow.

4. The slope has a value between 0.2 and 0.4. Usually the D/T ratio is not critical.

5. Horsepower versus result shows a slope of 0.4 or higher. These processes are sensitive to fluid shear and flow, and ratio of flow to shear usually has a marked effect. Scale-up is influenced by the chemical and physical properties of the process, and can also be markedly changed by the mixer design. In this group experimentation on the effect of D/T and other variables should be carried out.

The ratio of impeller size to tank size is related to the ratio of fluid flow to impeller velocity head. If necessary, the effect of D/T should be evaluated at either constant horsepower and the result measured, or at constant result and the horsepower measured to achieve this result.

The power input to a mixing vessel can be measured by several methods. Each of these methods has its own advantages and disadvantages and these are discussed below:

A. Calibrated Impellers: In an operation where the fluid properties can be accurately evaluated, power consumption can be determined from power curves and calibrated pilot plant turbines. Therefore, all that is necessary is to measure impeller speed and position and the factor to apply for fluid properties. This is by far the most common method, the most convenient and the least costly. A flat blade turbine (Fig. 4) can be applied with calibration curves.

B. Dynamometers: The simplest dynamometer consists of a motor mounted on a trunion bearing with pulley attached, running to a scale. Here the torque reaction on the impeller gives an equal and opposite reaction on the frame of the motor.

C. Electric Power Input: For small scale equipment, it is often very difficult to get accurate power measurements from wattmeter readings. The problems normally encountered are: 1. Operation below 1/3 of the rated motor capacity; 2. Excessive no load friction losses; 3. Unknown losses through variable speed devices. If wattmeter readings of high accuracy can be taken and if the losses of motor and drive assembly can be obtained with reasonable accuracy, this should offer an acceptable calculation for power input.

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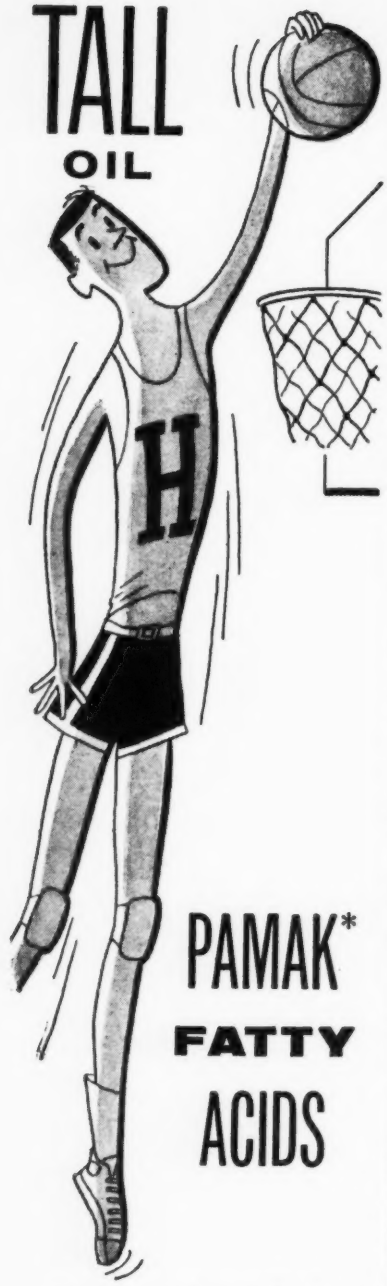

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ESA to Meet Dec. 2-5

The Entomological Society of America will hold its annual meeting at the Hotel Peabody, Memphis, Tenn., Dec. 2-5, it was announced recently by H. M. Armitage, president. The program mainly will consist of papers on new developments in insecticides and commercial exhibits by various firms in the insecticide field. Dr. E. N. Woodbury, Hercules Powder Co., Wilmington, Del., has been named program committee chairman, while Harold B. Jones has been appointed chairman of the exhibits committee. Companies interested in exhibiting at the show may contact Mr. Jones at 2772 Natchez Lane, Memphis.

Aerosol Seminar

(*From Page* 125)

du Pont de Nemours & Co., Wilmington, or Charles E. Beach, John C. Stalfort & Sons, Inc., Baltimore, will discuss the aerosol market. David Tillotson of Pennsalt Chemicals Corp., Philadelphia, will speak on the "Aerosol Package"—typical systems and propellants.

Following a 15 minute intermission, the morning session resumes with a discussion of containers by W. Earl Graham of the Can Division, Crown Cork & Seal Co., Philadelphia. Walter Beard of Risdon Mfg. Co., Naugatuck, Conn. or Joseph C. Pizzurro, Precision Valve Corp., Yonkers, N. Y., will speak on valves.

"Possible Pharmaceutical Applications" of pressure packages will be discussed by Dr. Barr in the first paper of the afternoon following lunch.

After another 15 minute intermission the seminar resumes with the final presentation of the afternoon, "Entering the Market". Robert Foresman, Philadelphia consultant, will be the speaker.

The concluding feature of the day will be a summary by Dr. Tice.

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Chemical Engineer and Chemist
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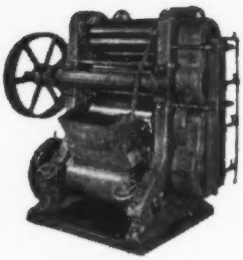

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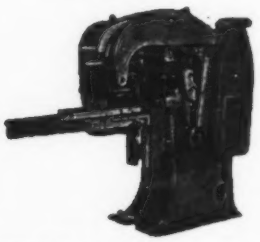

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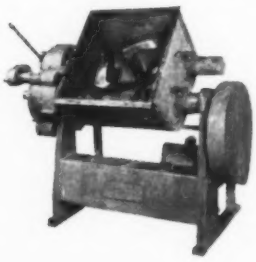

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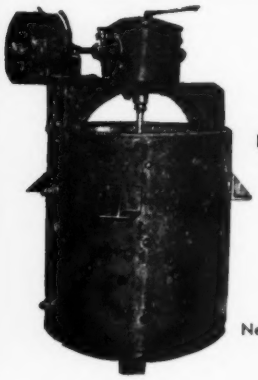

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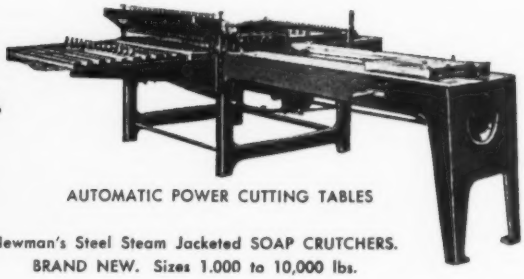

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(*Reference Books see page* 184)

Princess Matchabelli Dies

Princess Norina Matchabelli, who along with her late husband Prince George founded Prince Matchabelli Perfumery, Inc., died June 15 at Myrtle Beach, S. C., after a long illness. They organized the perfume concern, now considered one of the top international perfumeries, in the late 1920's. After her husband's death in 1935, Princess Norina ran the business until it was sold in 1937.

—★—

"Pepsodent" Promotion

Lever Brothers Co., New York, recently announced a sales promotion campaign on behalf of its "Pepsodent" tooth powder. The campaign features an offer of two large size cans of powder for about 25 per cent less than full retail value. The two cans are taped back-to-back. Copy on the banding tape calls attention to consumer savings.

—★—

Drain Pipe Solvent Data

A new bulletin describing proper application of drain pipe chemicals when repairing partially clogged drain lines, was issued recently by the Institute of Real Estate Management, an affiliate of the National Association of Real Estate Boards, Washington, D. C.

Solvents, the booklet states, are effective only if stoppage is caused by grease or other materials which can be attacked by the chemical and heat, and only when the solvent can reach the stoppage before reaction and accompanying heat have expired.

The bulletin advises the use of drain solvents only when the line has slowed down its rate of flow and is not entirely stopped. In the latter case, it recommends the services of a trained repair specialist. It also stresses the chemical's capacity for causing serious burns, even after having been dormant for several hours.

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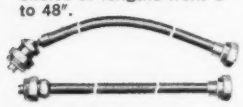

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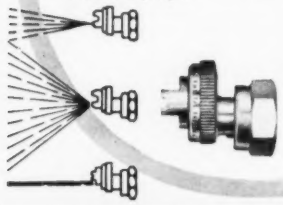

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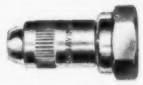

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Harold C. Wood has been appointed Boston district manager of Onyx Oil and Chemical Co., Jersey City, N. J., it was announced recently. In his new assignment, Mr. Wood will be in charge of sales of the firm's line of surface active agents and industrial chemicals in the New England states. Mr. Wood formerly was sales representative for Sandoz Chemical Works, Inc., New York.

—★—

GE Appoints Long

S. F. Long has been appointed Chicago district sales manager of the silicone products department of General Electric Co., Waterford, N. Y., it was announced late last month by J. T. Coe, department sales manager. One of the department's senior salesmen, Mr. Long came to Chicago from the Boston office where he was located since joining GE ten years ago.

—★—

Color Stable Stearic

Guaranteed color stability is the novel feature offered by Armour and Co., Chicago, in its new double pressed stearic acid. "Neo-Fat 18-54" has a guaranteed delivered color stability of 4.0 red and 30 yellow maximum readings on the five and one-quarter inch Lovibond scale after being subjected to a temperature of 200°C. for a period of two hours. This latest addition to the "Neo-Fat" line comes packed in flake form in 50 pound Multi-Wall paper bags, powdered in 140-pound fiber drums, and bulk shipped in aluminum tank cars.

Specifications and test procedures are available as a four-page bulletin published recently by Armour Chemical Division, 1355 West 31st Street, Chicago 9.

William T. Brady, left, president of Corn Products Refining Co., New York, accepts company's new corporate symbol from Harley Earl, head of industrial design firm which created the trademark. The new emblem, symbolizing a cross section of corn, carries the calligraphic "CP" in red with a circular golden yellow frame.

—★—

Carbide Appoints Harlow

J. B. Harlow has been appointed central division manager of Union Carbide Chemicals Co., New York, it was announced recently. Mr. Harlow joined Carbide in 1941 as a technical representative. He was named manager of the Albany district in 1949 and three years later was appointed Atlanta district manager. He became Detroit district manager in 1954.

Oronite Names Youker

M. P. Youker has been appointed assistant manager of the western export department of Oronite Chemical Co., San Francisco, it was announced recently. In his new post, Mr. Youker will be concerned with marketing the company's products in Central America, South America, Mexico and the Far East. For the past ten years, he had been head of Oronite's technical service department.

—★—

New Monsanto Plant

Monsanto Chemical Co., St. Louis, recently began construction of an addition to its Anniston, Ala., plant. The new facilities will be used for production of "Niran," an ethyl parathion insecticide, and methyl parathion. The latter compound has been produced at Monsanto's Nitro, W. Va. unit until last April when an explosion destroyed manufacturing facilities. The new plant is scheduled for completion late this fall.

—★—

Drackett Sales Increase

Sales and income of Drackett Co., Cincinnati, showed a slight increase in the six months ended Mar. 31, it was announced recently. Net sales totaled $14,835,894, as compared with $13,221,758, in the similar six months of the preceding year. Net income amounted to $506,934, equal to share earnings of 62 cents. This compared with an income of $441,437, equal to earnings of 51 cents, in the six months ended Mar. 31, 1956.

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Coming Meetings

American Chemical Society, national meeting, New York, Sept. 8-13.

American Oil Chemists Society, fall meeting, Cincinnati, Sept. 30, Oct. 1 and 2.

Association of American Soap & Glycerine Producers, 31st annual convention, Waldorf-Astoria Hotel, New York, Jan. 22-24, 1958.

Chemical Industries, 26th Exposition, Coliseum, New York, Dec. 2-6.

Chemical Market Research Association, Lake Placid, N. Y., Sept. 16-17.

Chemical Specialties Manufacturers Association, 44th annual meeting, Hollywood Beach Hotel, Hollywood, Fla., Dec. 9-12; 44th midyear meeting, Netherland Plaza Hotel, Cincinnati, May 19-21.

Drug, Chemical and Allied Trades Section, New York Board of Trade, 67th annual meeting, Galen Hall, Wernersville, Pa., Sept. 19-21, 1957.

Entomological Society of America, annual meeting, Peabody Hotel, Memphis, Tenn., Dec. 2-5.

Grocery Manufacturers of America, 49th annual meeting, Waldorf Astoria Hotel, New York, Nov. 11-13, 1957.

International Sanitation Maintenance Show & Conference, 2nd annual exposition, Navy Pier, Chicago, Oct. 14-16.

National Agricultural Chemicals Association, annual meeting, Essex and Sussex Hotel, Spring Lake, N. J., Sept. 4-6.

National Hotel Exposition, 42nd show, Coliseum, New York, Nov. 11-15.

National Pest Control Association 24th annual convention, Louisville, Ky., Oct. 21-24.

National Sanitary Supply Association, 35th annual convention and trade show, Coliseum, New York, Feb. 22-24, 1958.

National Supermarket Non-Food Exhibit, Shrine Exposition Hall, Los Angeles, August 25-28.

Packaging Machinery & Materials Convention, Convention Hall, Atlantic City, N. J., March 25-28, 1958.

Plant Maintenance & Engineering Show, 9th annual exposition, International Amphitheater, Chicago, Jan. 27-30.

Synthetic Organic Chemical Manufacturers Association, monthly luncheon meetings, Roosevelt Hotel, New York, Sept. 10, Oct. 8, Nov. 12.

Toilet Goods Association, 23rd annual convention, Poland Spring House, Poland, Maine, June 25-29, 1958.

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Tale Ends

LOOK for Lever, later on this month, to introduce a new detergent bar in test market. "Praise," as the new toilet bar is called, contains a bacteriostat Lever spokesmen say is "better than hexachlorophene." Yup, it's even better than "Lifebouy's" TMTD, says Lever.

• • • • •

Some time ago the FBI and other law enforcement agencies requested aerosol marketers to stop calling them aerosol "bombs." For awhile the explosive noun pretty well died out of advertising copy and publicity releases for aerosols. Lately, the word seems to be creeping back into the language of pressure packaging. A TV commercial of one of the major marketeers states so-and-so's shave cream is available in tubes or "shave bombs." Another advertiser, this time in full pages in newspapers, talks about his new line of insecticide aerosol bombs. This copy is used by one of the largest and oldest aerosol marketers and fillers. Although there is no way legally to compel advertisers to stop using the word "bomb" in their copy, for their own good aerosol sellers ought to exercise a little restraint and warn their agencies that the word is taboo.

• • • • •

A note to the effect that Miss Jean Cameron Bush, daughter of Edward A. Bush of the perfuming materials clan was married June 22 to Richard Jordan, Jr., leaves us with mixed emotions. We're happy to report the good news, even though it tends to confirm a sneaking feeling that we are getting older. The bride is the daughter of Edward A. Bush, sales manager of Dragoco, Inc., New York. Her grandfather, of course, is Burton T. Bush, retired dean of the American aromatic chemical industry now residing in the Everglades—or someplace in Florida. Wally Bush of Ungerer & Co. is the young woman's great uncle and she is a niece also of B. T. Bush, Jr., of the aromatics division of Hoffmann-La Roche.

• • • • •

Also venturing into the field of matrimony was Horst Gerberding, partner of Dragoco, Inc., Holzminden, Milano and New York, who was married recently to Miss Ingrid Radloff-Cossel.

• • • • •

Although he asked that this item be included in our "Packaging Notes" or "News" sections, we felt the fact that Robert H. Brunner's announcement of the birth of his first child might be more appropriate on this page. Anyway, Mr. and Mrs. Brunner are proudly showing off newly arrived Claire Caroline to friends and neighbors. Pop is assistant sales manager of Brulin & Co., Indianapolis wax makers.

• • • • •

Up in New Haven, Conn., there's quite a debate going on over what constitutes free soap. It seems that 70,000 bars of soap were mailed from Cincinnati at a postal rate of three cents a bar. The soap samples were sent to "occupant" at most street addresses in New Haven. Now, says Postmaster Frank A. Lattanzi, it's costing the Post Office Department at least $5,000 to deliver the 70,000 "free" soap samples. He states it costs the post office between 10 and 12 cents per bar for handling. Why it should cost 10 to 12 cents to handle the soap Postmaster Lattanzi did not explain. Nor did he tell us how he arrived at the $5,000 figure if it costs at least 10 cents a bar to mail 70,000 bars of soap. Sounds like it should cost at least $7,000, not $5,000.

• • • • •

Giving an atomic age twist to that old-time melodrama, "There's Gold in Them Thar Hills," Van Ameringen-Haebler recently revealed it is burying more than 50,000 process specifications and aromatic chemical and flavor formulas. These formulas have been microfilmed by the New York aromatic chemical and flavor firm. They are stored in vaults tunneled into the base of a mountain in upper New York State, according to van Ameringen-Haebler. The vaults are said to penetrate 300 feet into a mountain of rock and are used by a number of banks, banknote companies and industrial firms. One of the major reasons for taking this additional fire and catastrophe precaution is to provide further assurance for the company's customers who rely on VAH formulations for the manufacture of their own products. All of which raises the question: Will there be any manufacturing plants left to utilize these formulas in case of an atomic attack?

• • • • •

A chemical specialty that will help lower golf scores? Yep, all you duffers, by using a new pre-emergence weed preventer (a herbicide to you unlettered blokes) putt-spoiling weeds and tufts of unwanted grass can be made to vanish from golf courses. Texas golf course superintendents are using "Crag Sesone," Union Carbide Chemicals Company's weed preventer, formerly called "Crag Herbicide-1," to control silver crabgrass. A course, annual bunch grass, silver crabgrass is frequently found on Texas golf courses. Now, however, smoother greens, truer putts, and lower scores (to say nothing of fewer temper tantrums) are resulting from treatments with the new herbicide.

• • • • •

In suing a car washer for damaging their $7,500 Cadillac convertible a midwestern couple claimed that a "dirty, gritty abrasive material was forced against the automobile in excessive quantities and under terrific pressure." As a result, they charged, the interior and exterior finish, the upholstery, accessories, engine, carpeting, heater, radio, trunk, windows and electrical parts were damaged. Somebody leave a window open?

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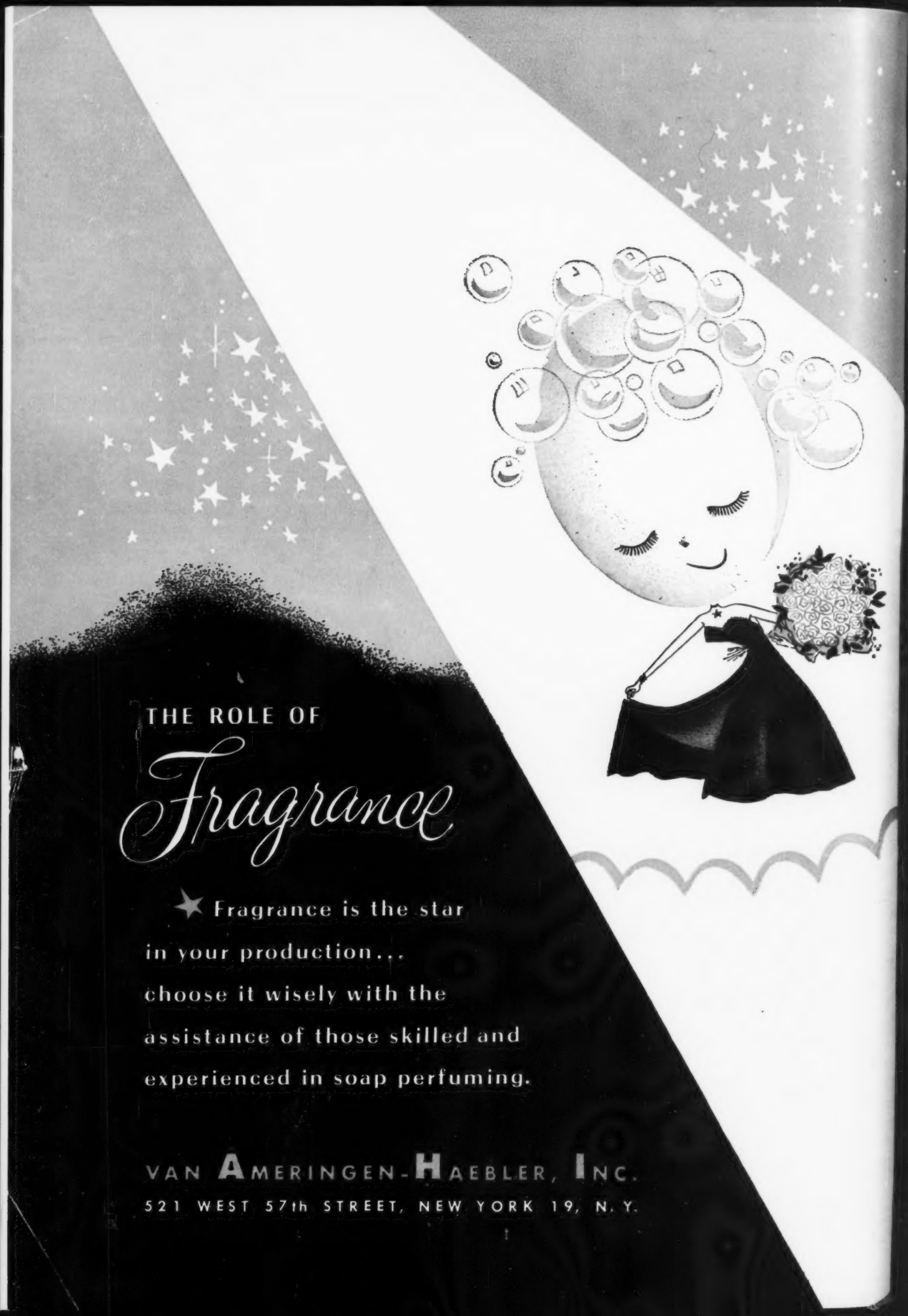
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